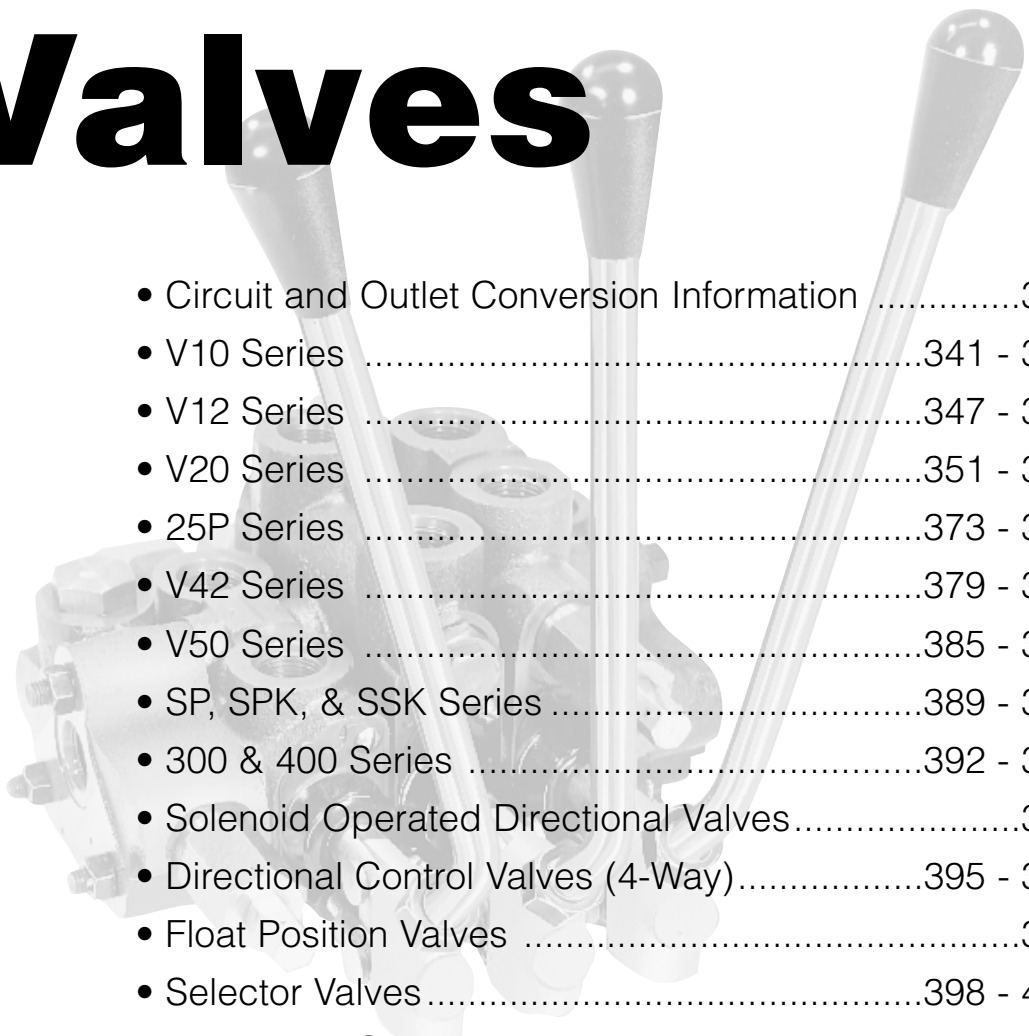


Valves

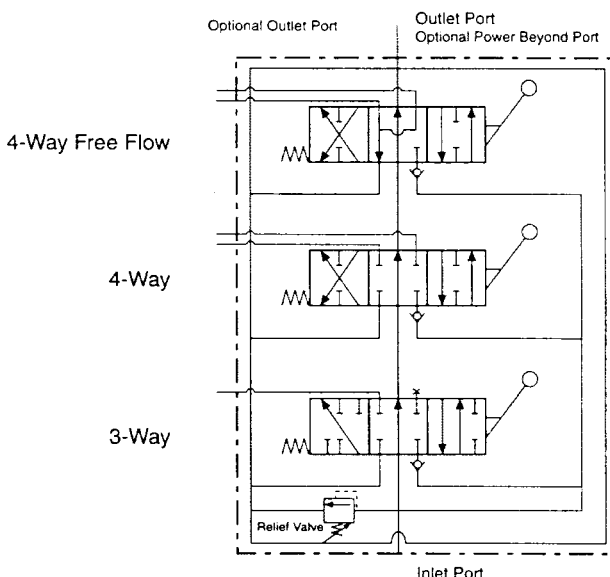


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PARALLEL HYDRAULIC CIRCUITS

The most common type of hydraulic circuit is the parallel circuit. Refer to the parallel circuit diagram. With all valve spools centered, the pump flow will return to tank at low pressure through the open center bypass. When a spool is actuated, the open center bypass is blocked and the inlet is connected to one of the work ports. The opposite work port will be connected to tank, completing the circuit. If more than one valve spool is shifted at the same time, the oil will follow the path of least resistance and the hydraulic cylinder or motor having the lightest load will begin to function first.

If the spool of the cylinder or motor having the lightest load is metered (not fully shifted), then both may be operated at the same time.



OUTLET CONVERSION PORT OPTIONS

The outlet conversion port is machined to accept the option plugs listed here:

■ Closed Center Plug (closed center systems)

Install a closed center plug when using a variable displacement pump. The closed center plug will block hydraulic pump flow when all valve spools are in neutral. High pressure is maintained at the control valve inlet. The maximum system pressure is typically set with the compensator adjustment on the pump.

■ Power Beyond Sleeve (high pressure carry over)

By installing a power beyond sleeve, hydraulic oil under pressure will be carried thru the valve making it available to a second control valve. In a power beyond circuit, the upstream valve will always have priority. Hydraulic oil will only be available to the downstream valve when all the spools in the upstream valve are in neutral. If the pressure requirements for both valves are the same, only one system relief valve is required. It must be installed in the upstream valve. Each control valve may have its own relief valve set at a different pressure, but the highest pressure setting must be in the upstream valve. When two valves are connected together in this manner, each valve must have a return line to tank.



V10

Directional Control Valves

Gresen's Model V10 sectional directional control valves provide parallel or tandem circuit operation for open center and closed center systems. They offer economy and excellent performance in a compact design.

- Parallel and Tandem work sections with individual load (reverse flow) checks
- Available for open center, closed center and power beyond applications
- Low flow and high flow spool options available offering flows to 15 GPM (45 lpm).
- Continuous system operating pressures to 3500 PSI (Work port pressures to 5000 PSI)
- Utilizes many common components such as relief valves, spool positioners and handles with Models V11 and V16
- 3-Way, 4-Way, and 4-Way Float operation
- Numerous manual spool positioner options plus remote hydraulic or electric solenoid operation
- Work Port relief valves and anti-cavitation check valves available
- Single handle or dual function mechanical joystick control of manual sections
- Enclosed spool ends with handles
- Long life - low friction spool seals

Specifications

Nominal Flow Rating ¹	15 GPM (56,7 liters/min)
Operating Pressure (maximum)	
Continuous Operating	3500 PSI (242 bar)
Work Port	5000 PSI (345 bar)
Exhaust Core	500 PSI (34,5 bar)
Operating Temperature	-40°F (-40°C) to +200°F (+93°C)
Standard Port Sizes ²	
Inlet	SAE 10
Outlet	SAE 10
Power Beyond	SAE 10
Work Ports (Manual and Solenoid Work Sections)	SAE 8
Fluid Compatibility	
Petroleum Based	.60-1000 SSU (10-216 cST)
O-Ring Seals	Buna-N Standard (Optional Viton)
Spool Seals	Lip Type (Standard in 24990 Housings) O-Rings (Standard in 23592 Housings)
Filtration Required	.10 micrometers (nominal)
Number of Work Sections	1-9
Weight (approx.)	
No. 23613 Inlet Cover	Approx. 5 lbs. (2,3 kg)
No. 23627 Outlet Cover	Approx. 5 lbs. (2,3 kg)
No. 24990 Work Section (Manual)	Approx. 6 lbs. (2,8 kg)
No. 23962 Work Section (Solenoid)	Approx. 8.5 lbs. (3,8 kg)
Mounting Position	.Not Restricted

See Page 326 For Ordering Information



23613 Left Cover

V10 INLET COVERS (Housing No. 23613)

Item No.	Model Number	Part Number	End Inlet	End Outlet	Top Inlet	Top Outlet	SAE 10	SAE 8	Pressure Reducing Valves ①	List Price
1	10-LC-10	13650709	•	•	•	•	•			57.00
2	10-LC-8	13650710	•	•	•	•		•		55.00
3	10-LC-10-PRV	26157001			•	•	•		•	177.10

All inlet covers machined to accept main relief cartridges. Two SAE port plugs are furnished loose with Items 1 and 2.

① Used for Solenoid Valve Assemblies. Only top ports are available with this cover.

Main Relief Cartridges for Inlet Covers

Item No.	Model Number	Part Number	Pressure Range and Setting						Externally Adjustable PSI c/p	List Price
			500-1249 Set @ 1200 PSI c/p	1250-1749 Set @ 1700 PSI c/p	1750-1999 Set @ 1950 PSI c/p	2000-2599 Set @ 2550 PSI c/p	2600-3000 Set @ 3000 PSI c/p	3001-3500 Set @ 3500 PSI c/p		
1	RCM-1200	13650712	•							36.10
2	RCM-1700	13650713		•						36.10
3	RCM-1950	13650714			•					36.10
4	RCM-2550	13650715				•				36.10
5	RCM-3000	13650716					•			36.10
6	RCM-3500	13650774						•		36.10
7	K-10-NR	13650718	No Relief Cavity Plug for V10 Inlet Covers							10.80

Model RCM relief cartridges are internal shim adjustable.



No Relief Cavity Plug

Relief External Adjustment Kit

Item No.	Model Number	Part Number	Description	List Price
1	K-WH-A	8650381	External Screw Adjustment Option for RCM Relief Cartridges	15.60



External Adjustment Kit

V10 OUTLET COVERS (Housing No. 23627)

Item No.	Model Number	Part Number	SAE 8	SAE 10	Top Outlet	End Outlet	Machined for Power Beyond	With Mechanical Pressure Control Cartridge ①	List Price
1	10-RC-8-EY	13650719	•		•	•	•		41.60
2	10-RC-10-EY	13650720		•	•	•	•		43.70
3	10-RC-10-P-MECH	26157002		•	•	•		•	105.40

All outlet covers machined to accept (top) Option Cartridges. Two SAE port plugs furnished loose with each cover.

① Used for Solenoid Valve Assemblies.

The pressure control cartridge must be located in the downstream valve if using the optional power beyond feature in the solenoid-operated upstream valve.



23627 Outlet Cover

Outlet Cover Conversion Kits

Item No.	Model Number	Part Number	Description	List Price
1	K-10-C	13650722	Closed Center Plug	15.50
2	K-10-8-Y	13650723	SAE 8 Power Beyond Sleeve	13.40
3	K-10-10-Y	13650724	SAE 10 Power Beyond Sleeve	13.40
4	K-10-P (MECH)	26157055	Pilot Control Cartridge (for Solenoid Valves)	56.50

The power beyond sleeves listed here are required for (top) power beyond port only.

To power beyond out the (end) of the valve, requires installation of the K-10-C plug in the (top) option port. Refer to the V10 Service Manual for procedures on selecting Closed Center and Power Beyond options.



Closed Center Plug

V10 Parallel Work Sections with Machined Upper Option Cavities (Housing No. 24990)

Item No.	Model Number	Part Number	SAE 8 [8]	3-Way 3-Pos [3]	4-Way 3-Pos [4]	4-Way 3-Pos Free Flow [F4]	4-Way 4-Pos Float [K4]	Spring Return to Neutral [0]	3-Pos Detent [D]	1-Pos. Detent (Spool In) [R]	List Price
1	10-08-03	13650776	•	•				•			119.40
2	10-08-R3	13650971	•	•						•	156.70
3	10-08-04	13650973	•		•			•			113.30
4	10-08-F4	13650975	•			•		•			122.00
5	10-08-DF4	13650977	•			•			•		141.70
6	10-08-K4	13650979	•				•				149.20

The work sections listed above all have the upper work port relief option cavities machined and plugged.
V10 work sections do not include handles or brackets. They are supplied (LCHA) Less Complete Handle Assembly.



24990 Work Section

V10 Parallel Work Sections Without Upper Option Cavities (Housing No. 24990)

Item No.	Model Number	Part Number	SAE 8 [8]	3-Way 3-Pos [3]	4-Way 3-Pos [4]	4-Way 3-Pos Free Flow [F4]	4-Way 4-Pos Float [K4]	Spring Return to Neutral [0]	3-Pos Detent [D]	1-Pos. Detent (Spool In) [R]	List Price
1	10-08-N-03	13650726	•	•				•			99.20
2	10-08-N-R3	13650970	•	•						•	136.50
3	*10-08-N-04	13650972	•		•			•			93.10
4	10-08-N-F4	13650974	•			•		•			101.80
5	10-08-N-DF4	13650976	•			•			•		121.50
6	10-08-N-K4	13650978	•				•				129.00

The 'N' in the work sections listed above designates that the upper work port relief option cavities are NOT machined. If the application requires the use of work port option cartridges, (i.e. reliefs or anti-cavitation checks), do not select work section from this group.
V10 work sections do not include handles or brackets. They are supplied (LCHA) Less Complete Handle Assembly.

V10 Tandem Work Sections with Machined Upper Option Cavities (Housing No. 24990)

Item No.	Model Number	Part Number	SAE 8 [8]	3-Way 3-Pos [3]	4-Way 3-Pos [4]	4-Way 3-Pos Free Flow [F4]	4-Way 4-Pos Float [K4]	Spring Return to Neutral [0]	3-Pos Detent [D]	1-Pos. Detent (Spool In) [R]	List Price
1	10T-08-03	13650782	•	•				•			127.10
2	10T-08-R3	13650981	•	•						•	164.40
3	10T-08-04	13650983	•		•			•			120.90
4	10T-08-F4	13650985	•			•		•			129.60
5	10T-08-DF4	13650987	•			•			•		149.40
6	10T-08-K4	13650989	•				•				156.90

The work sections listed above all have the upper work port relief option cavities machined and plugged.
V10 work sections do not include handles or brackets. They are supplied (LCHA) Less Complete Handle Assembly.

V10 Tandem Work Sections Without Upper Option Cavities (Housing No. 24990)

Item No.	Model Number	Part Number	SAE 8 [8]	3-Way 3-Pos [3]	4-Way 3-Pos [4]	4-Way 3-Pos Free Flow [F4]	4-Way 4-Pos Float [K4]	Spring Return to Neutral [0]	3-Pos Detent [D]	1-Pos. Detent (Spool In) [R]	List Price
1	10T-08-N-03	13650738	•	•				•			106.90
2	10T-08-N-R3	13650980	•	•						•	144.20
3	10T-08-N-04	13650982	•		•			•			100.70
4	10T-08-N-F4	13650984	•			•		•			109.40
5	10T-08-N-DF4	13650986	•			•			•		129.20
6	10T-08-N-K4	13650988	•				•				136.70

The 'N' in the work sections listed above designates that the upper work port relief option cavities are NOT machined. If the application requires the use of work port option cartridges, (i.e. reliefs or anti-cavitation checks), do not select work section from this group.
V10 work sections do not include handles or brackets. They are supplied (LCHA) Less Complete Handle Assembly.



24990 Work Section

V10 'Parallel' Solenoid-Operated Work Sections with Machined Upper Option Cavities (Housing No. 23962)

Item No.	Model Number	Part Number	SAE 8 [8]	3-Way 3-Pos [3]	4-Way 3-Pos [4]	4-Way 3-Pos Free Flow [F4]	12 VDC On/Off Solenoid [SOL-I-12]	12 VDC Proportional Solenoid [EPC-I-12]	List Price
1	10-08-03-SOL-I-12	26157003	•	•			•		440.20
2	10-08-03-EPC-I-12	26157005	•	•				•	547.10
3	10-08-04-SOL-I-12	26157007	•		•		•		434.10
4	10-08-04-EPC-I-12	26157009	•		•			•	541.00
5	10-08-F4-SOL-I-12	26157011	•			•	•		442.80
6	10-08-F4-EPC-I-12	26157013	•			•		•	549.70

The solenoid-operated work sections listed above all have the upper work port relief option cavities machined and plugged. These sections do NOT offer the handle override feature. Contact the Gresen factory in Minneapolis for solenoid sections with handle.

Solenoid Cartridges & Coil Kits

Refer to page 104 in the Electronics Section

V10 Spool Positioner Option Kits



Positioner Kit

Item No.	Model Number	Part Number	Description	List Price
1	K-10-A	13650746	Spring Extended Spool Positioner [Ⓢ]	24.20
2	K-V10-A	26157056	Spring Extended Spool Positioner (For Use With 24990 Housing) [Ⓢ]	24.20
3	K-10-D	13650747	3-Position, 'D' Detent Spool Positioner	29.10
4	K-V10-D	26157057	3-Position, 'D' Detent Spool Positioner (For Use With 24990 Housing)	29.10
5	K-10-M	13650748	Manual 'M' Spool Positioner	23.10
6	K-V10-M	26157058	Manual 'M' Spool Positioner (For Use With 24990 Housing)	23.10
7	K-10-S	13650749	Spring Center to Neutral Spool Positioner	26.00
8	K-V10-S	26157059	Spring Return to Neutral Spool Positioner (For Use With 24990 Housing)	26.00
9	K-10-RI	13650750	1-Position, 'R' Detent Spool 'IN' with Spring return to Neutral	47.60
10	K-V10-RI	26157060	1-Position, 'R' Detent Spool 'IN' with Spring return to Neutral	47.60
11	K-10-RO	13650751	1-Position, 'R' Detent Spool 'OUT' with Spring return to Neutral [Ⓢ]	48.40
12	K-V10-RO	26157061	1-Position, 'R' Detent Spool 'OUT' with Spring return to Neutral (For Use with 24990 Housing) [Ⓢ]	48.40

The Above K-V10-(Kits) are for use with the new style 24990 work section housings. The internal working parts are NOT interchangeable with the equivalent K-10-(Kits).

- Ⓢ K-10-A and K-V10-A Spool Positioners holds the spool in the 'B' port power (Spool Out) position and will limit the shifting of the spool to the neutral position only.
- Ⓢ K-10-RO and K-V10-RO Spool Positioner detent sleeve may be reversed for 'RIO' (Detent 'In' and 'Out') applications. Refer to the V10 Service and Parts manual for procedures.

V10 Mechanical Joysticks

Fits V10 '24990' Work Section Housings. Includes two Spool Clevis Adapters.

Item No.	Model Number	Part Number	Description	List Price
1	MJA2-10L-NB	13650968 [Ⓢ]	V10 Mechanical Joystick, 'LH' Assembly	148.90
2	MJA2-10R-NB	13650969 [Ⓢ]	V10 Mechanical Joystick, 'RH' Assembly	148.90
3	K-MJA-O	13650691	Mechanical Joystick 'Offset' Handle Assembly	25.80
4	K-MJA-S	13650690	Mechanical Joystick 'Straight' Handle Assembly	22.60

- Ⓢ Includes boot assembly.

Handle Option Kits

Item No.	Model Number	Part Number	Description	List Price
1	K-10-UBH	26157100		20.50
2	K-10-VH	13650752	Vertical Handle Assembly	34.70
3	K-10-HH	13650753	Horizontal Handle Assembly	34.70
4	K-10-VH-EXT	13650786	Extended Vertical Handle Kit - For use in V10/V11 valves using port reliefs on handle end	46.40
5	K-10-HH-EXT	13650948	Extended Horizontal Handle Kit - For use in V10/V11 valves using port reliefs on handle end	46.40
6	K-10-UH-BOOT ♦	26157101		5.20

Refer to Model V10 Service Catalog No. GSD-1010 for information regarding handle installation.



Extended Vertical Handle Assembly



Vertical Handle Assembly



Horizontal Handle Assembly

Section Stud Assembly Kits

Item No.	Model Number	Part Number	Description	List Price
1			Spacer for Older Handles	6.50
2	K-10-1	13650755	Stud Kit for One (1) Work Section	26.70
3	K-10-2	13650756	Stud Kit for Two (2) Work Sections	26.70
4	K-10-3	13650757	Stud Kit for Three (3) Work Sections	26.70
5	K-10-4	13650758	Stud Kit for Four (4) Work Sections	26.70
6	K-10-5	13650759	Stud Kit for Five (5) Work Sections	26.70
7	K-10-6	13650760	Stud Kit for Six (6) Work Sections	29.60
8	K-10-7	13650761	Stud Kit for Seven (7) Work Sections	29.60
9	K-10-8	13650762	Stud Kit for Eight (8) Work Sections	29.60
10	K-10-9	13650763	Stud Kit for Nine (9) Work Sections	29.60
11	K-10-10	13650764	Stud Kit for Ten (10) Work Sections	29.60
12	K-10-11	13650765	Stud Kit for Eleven (11) Work Sections	29.60
13	K-10-SECT-SEAL	13650767	Section Seal Kit	3.30
14	K-10-SOL-BRACKET	26157088	(Tall) Mounting Bracket - For use with V10 Solenoid Valve Assemblies	23.70
15	K-10-SOL-SEAL	26157030	Section Seal for Solenoid Pilot Passage (25 pieces of 21866001 Seal).	29.50

Each Stud Kit includes (4) Studs, (8) Nuts, (2) Mounting Brackets and the required number of Section Seals.



Assembly Stud Kit

Work Port Relief/Anti-Cav Options

Item No.	Model Number	Part Number	(A) Screw Adjustable	(N) Non-Adj. Tamper Resistant	Anti-Cav Check	Relief Valve	Relief Valve A/C Check	500-5000 Set @ 3000 PSI c/p	List Price
1	K-10-AC	13650770			•				39.80
2	RP10A-3000	13650768	•			•		•	38.30
3	RP10N-3000	13650769		•		•		•	38.30
4	RP10A-AC 3000	13650771	•				•	•	49.30
5	RP10N-AC 3000	13650772		•			•	•	49.30

Model RP10A (-AC) relief cartridges are externally adjustable. Model RP10N (-AC) relief cartridges are preset at specified setting and offer a 'tamper resistant' cover.



RP10A Relief Cartridge

Work Port No Relief 'NR' Plug Kit

Item No.	Model Number	Part Number	Description	List Price
1	K-10-NR-WP	13650773	Work Port Relief Cavity 'NR' Plug (Not for use in V10 Inlet Covers)	10.80



No Relief Cavity Plug



V12

Directional Control Valves

- 12 GPM nominal flow rating
- Pressures to 3000 PSI
- Lock-out sections available
- High and Low profile sections allow you to use workport options only on those sections that require them
- Manual or solenoid actuator options

Gresen's Model V12 Directional Control Valve is designed for parallel hydraulic circuit applications, up to 3000 PSI (207 bar) continuous operating pressure.

Each valve stack consists of an inlet cover, one or more work sections and an outlet cover. A variety of work sections, spools, spool actions, end covers and relief combinations are available to provide the exact type of valve assembly required for any given application whether mobile, industrial or agricultural.

Specifications

Pressure Rating:

Continuous Operating, Max. 3000 PSI (207 bar)
Tank Port (Exhaust), Max. 500 PSI (34,5 bar)

Capacity:

Nominal Flow 12 GPM (45,4 litres/min)

Operating Temperature:-40°F (-40°C) to 176°F (80°C)

Port Size:

Inlet SAE 10
Outlet SAE 10
Work Ports SAE 8
Power Beyond SAE 8, SAE 10

Filtration Required (Min.) 33 micrometre

Weight:

Inlet Cover Approx. 3.3 lbs. (1,5 kg)
Outlet Cover Approx. 3.3 lbs. (1,5 kg)

Work Sections:

Standard Approx. 5 lbs. (2,3 kg)
Accessory Approx. 6.5 lbs. (2,7 kg)

See Page 326 For Ordering Information



V12P Left Cover

LEFT COVER

Order Code	Bill of Material #	SAE 10 Port Size [2]	SAE 8 Port Size [1]	Top & End Inlet [U]	Plastic Relief Cavity Plug [N]	Relief Position "B" [B]
V12P-2UNB	8650-584	•		•	•	•
V12P-1UNB	8650-974		•	•	•	•

Note: All Left Covers are machined to accept Main Relief Cartridge.

Main Relief Options

Includes all necessary seals.



Model CRV-15B
Pilot Operated Relief
Valve Cartridge

Order Code	Bill of Material #	Description
RCP-15A	8650-585	No Relief Plug Kit (NR Option)
CRV-15B-2500	8650-586	Pilot Operated Relief Valve Cartridge set at 2500 PSI. Crack at 1 GPM
CRV-15F-2500	8650-608	Direct Acting Relief Valve Cartridge set at 2500 PSI. Crack at 1 GPM

Above Relief Valves are screw adjustable from 500 to 3000 PSI.

RIGHT COVER

V12E Right Cover

Order Code	Bill of Material #	SAE 10 Port Size [2]	SAE 8 Port Size [1]	Top & End Outlet [U]	Machined from Opened Center [O]
V12E-2UO	8650-587	•		•	•
V12E-1UO	8650-972		•	•	•

Open Center port may be converted to Closed Center or Power Beyond using Option Kits below.

Right Cover Option Kits

Order Code	Bill of Material #	Description
CBP-15C	8650-588	Closed Center Plug
PBS-15N	8650-589	SAE 8 Power Beyond Sleeve
PBS-15P	8650-590	SAE 10 Power Beyond Sleeve

WORK SECTIONS

Item No.	Order Code	Bill of Material #	Spring Centered [C]	4-Way 3-Position [A]	3-Way 3-Position [E]	4-Way 4-Position Float [F]①	4-Way 3-Position Free Flow Spool [J]	Standard Low Section [S]	Relief Option Section [R*]	Lockout Option Section [L**]
1	V12W-1FBC-ES	8650-591	•		•			•		
2	V12W-1FBC-ERNN	8650-971	•		•				•	
3	V12W-1FBC-AS	8650-593	•	•				•		
4	V12W-1FBC-ARNN	8650-970	•	•					•	
5	V12W-1FBC-JS	8650-806	•				•	•		
6	V12W-1FBC-FS①	8650-973	•			•		•		
7	V12W-1FBC-FRNN①	8650-969	•			•			•	
8	V12W-1FBC-JLEE	8650-807	•				•			•

Note: All work ports are SAE 8.

All spools include female spool end located on "B" port end - Handle bracket and handle assembly not included.

*All relief option sections [R] include machined and plugged (plastic plugs) work port options [NN].

**All lockout option sections [L] include cylinder lock valves [EE].

①Float Section(s) must be stacked next to the Inlet Cover to allow proper operation.



Relief Option Section
[R]



Lockout Option Section
[L]



Standard Low Section
[S]

Handle End Options

Handle Kit includes necessary hardware.

Order Code	Bill of Material #	Description
LVR-15-HDA	8650-598	Vertical Handle (includes bracket)



Vertical Handle

Section Stud Assembly Kits

Includes Section Seals and Nuts.

Order Code	Bill of Material #	Number of Work Stations
TRK-15-3*	8650-599	One Section
TRK-15-4*	8650-600	Two Section
TRK-15-5*	8650-601	Three Section
TRK-15-6*	8650-602	Four Section
TRK-15-7*	8650-603	Five Section
TRK-15-8*	8650-604	Six Section
TRK-15-9*	8650-605	Seven Section
TRK-15-10*	8650-606	Eight Section

*Total number of sections including inlet, work section(s) and outlet.

Spool Action Assembly
(Bonnet)**Spool Positioner Option Kit**

Order Code	Bill of Material #	Description
K-12-D	8650-607	3-Position Detent

Note: Cannot be used on Float Spool.

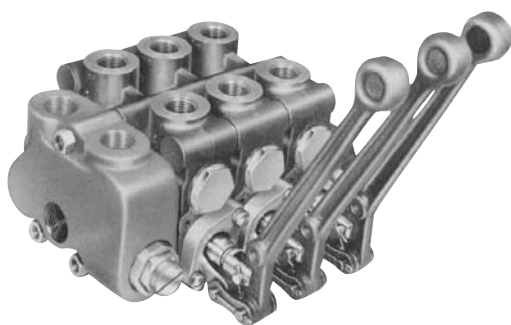
Work Port Option Kits

Includes all necessary seals.

Model CRV-15B
Pilot Operated Relief
Valve Cartridge

Order Code	Bill of Material #	Pressure Range PSI 500 to 3000 Set at 2500	Description
CRV-15F-2500	8650-608	•	Direct Acting Relief
CRV-15B-2500	8650-586	•	Pilot Operated Relief
CRV-15C-2500	8650-609	•	Combination Relief & Anti-Cav
CRA-15H	8650-610		Anti-Cavitation Check
RCP-15A	8650-585		No Relief Plug Kit (NR Option for "R" Body)
LCP-15P	8650-612		Lock Cavity Plug (for "L" Body)

Note: All above Relief Valves are screw adjustable.
Crack Pressure set at 1 GPM.



V20

Directional Control Valves

Specifications

Pressure Rating:

Continuous Operating, Max. 3500 PSI (242 bar)

Capacity:

Nominal Flow 20 GPM (76 litres/min)

Maximum Flow 30 GPM (114 litres/min)

Operating Temperature: -40°F (-40°C) to 176°F (80°C)

Filtration Required (Min.) 33 micrometre

Weight:

Inlet Cover Approx. 6 lbs. (2,7 kg)

Outlet Cover Approx. 3½ lbs. (1,6 kg)

Work Sections, Each Approx. 9 lbs. (4,10 kg)

Maximum Exhaust Core Pressure:

With Handle Bracket or Heavy Duty

Spool Seal Retainer Installed

Continuous Operating 500 PSI (34,5 bar)

Intermittent Peak 1000 PSI (69,0 bar)

With Standard Spool Seal Retainer

Installed 200 PSI (13,8 bar)

Gresen's Model V20 Directional Control Valves are available for open center or closed center systems. Open center models are available for parallel, tandem, combined parallel/tandem or series circuits. Closed center models are available for constant pressure or load sensing parallel circuits.

Optional Reduced Pressure Drop work sections are available for parallel or tandem open center circuits.

The wide variety of circuit options and excellent performance provided by Model V20 make it ideally suited for back hoe, front end loader and personnel lift applications.

- **Minimal spool actuating effort - Maximum, 50 pounds [22,6 kg] at the spool**
- **Improved, extra-fine metering**
- **Minimum pressure drops through open center and through work ports**
- **Float section may be installed at any point within the valve assembly**

Open Center System

Model	V20P	Parallel Circuit
	V20T	Tandem Circuit
	V20PT	Parallel/Tandem Circuit
	V20S	Series Circuit

Hydraulic oil is directed from the inlet port, through the open center core to the outlet port of the Directional Control Valve when all spools are in the neutral position. Shifting the valve spool directs oil flow to the desired work port.

Maximum circuit pressure is limited by the main relief valve, which relieves into the exhaust core.

In a neutral position, open center systems operate at full flow and at low pressure

Closed Center System

Model	V20C	Constant Pressure-Parallel Circuit
--------------	-------------	------------------------------------

The Model V20C work section has no open center core. Pump flow is blocked by the valve when the valve spool is in neutral position. Shifting the valve spool directs the oil flow to the desired work port.

A pump that varies the output flow and maintains a pre-determined output pressure is required for this type of circuit. Closed center systems typically operate at minimum flow and at high pressure standby when the valve spool is in the neutral position. The only flow required is that which will compensate for internal losses or for other system requirements.



8398 Left Cover



7736 Left Cover

V20 LEFT COVERS (Housing No.'s 8398 & 7736)

Order Code	Bill of Material #	End Inlet	Top Inlet	End Outlet	Top Outlet	Port Size SAE 12 [12]	Port Size 3/4" NPT [75]	With 4-25 GPM Flow Control	To Allow Use of Excess Flow [FC]
20-LC-75	8650-030	•	•	•	•		•		
20-LC-12	8650-029	•	•	•	•	•			
20-LC-12-FC	8650-028	•	•	•		•		•	•

Note: All the above inlet covers are machined to accept the main relief cartridges listed below.

Two port plugs are furnished loose with each cover, one is machined for 1/4" NPTF gauge port.
Excess flow plug is furnished with all 7736 housings.

Main Relief Options for V20 Inlet Covers

All set at "crack" pressure of 1 GPM.

Model WH
Relief Valve CartridgeModel RP51
Relief Valve Cartridge

Order Code	Bill of Material #	500-1249 Set @ 1200 PSI c/p	1250-1749 Set @ 1700 PSI c/p	1750-1999 Set @ 1950 PSI c/p	2000-2599 Set @ 2550 PSI c/p	500-3500 Set @ 3000 PSI c/p
WH-1200	8650-417	•				
WH-1700	8650-418		•			
WH-1950	8650-419			•		
WH-2550	8650-420				•	
RP51A-3000	8650-421					•
K-20-NR	8650-382	Relief Plug Kit (NR Option)				

Note: All above Relief Valves have stainless steel springs.

WH Relief Valves are internal shim adjustable.

RP51A Relief Valves are external screw adjustable.

Relief Option Kit

Order Code	Bill of Material #	Description
K-WH-A	8650-381	Screw Adjustable Option for WH Relief

V20 RIGHT COVERS (Housing No.'s 6770 & 8644)

Order Code	Bill of Material #	Outlet Port Size & Location			Top Power Beyond Port [MY] (8644 Housing Only)	Machined for Power Beyond [MY]	Includes Load Sense Option Includes Bleed-off [LS]	Includes 12VDC On-off Pressure Control Cartridge [PC]	24VDC On-off Pressure Control Cartridge [PC]	SAE 4 Load Sense Port & Pilot Seal C'bores [P-NB]
		3/4" NPT [75]	SAE 10 [10]	SAE 12 [12]						
20-RC-75-E	13650-147	END								
20-RC-75-E-MY	8650-027	END				•				
20-RC-10-E	13650-145		END							
20-RC-12-E	13650-146			END						
20-RC-12-E-MY	8650-024			END		•				
20-RC-12-E-LS	8650-025			END			•			
20-RC-12-E-PC-SOL-12①	8650-026			END				•		
20-RC-12-E-PC-SOL-24	13650-307			END					•	
20-RC-75-ET-75-MY	8650-023	END & TOP			3/4" NPT	•				
20-RC-12-ET-12-MY	8650-022			END & TOP	SAE 12	•				
20-RC-12-E-LS-P-NB (NB = No bleed off)②	13650-169			END						•

NOTE: A 3/4" NPT or SAE 12 Plug will be shipped with all 8644 Outlet Covers to plug either the outlet port or power beyond port if either is not required.

Plugging top power beyond port will convert valve to closed center unless internal plug is removed.

①This cover must be used in the downstream valve if a power beyond sleeve is used in the utility section of a solenoid upstream valve.

②No Bleed Off (NB) cannot be converted to Bleed Off. Bleed Off Covers, however, may be converted to No Bleed Off.



8644 Right Cover



Right Cover with Pressure Control Cartridge



6770 Right Cover

6770 Outlet Cover Option Kits

Order Code	Bill of Material #	Description
K-20-C	8650-099	Closed Center Plug
K-20-X	8650-100	Conversion Plug
K-20-50-Y	8650-101	1/2" NPT Power Beyond Sleeve
K-20-08-Y	8650-102	SAE 8 Power Beyond Sleeve
K-20-10-Y	8650-103	SAE 10 Power Beyond Sleeve

NOTE: These option kits may not be used with 6770 LS (Load Sense) or 8644 covers.

V20 PARALLEL WORK SECTIONS (Housing No. 8072)

Bracket Assembly included. Includes load checks where applicable.

Item No.	Order Code	Bill of Material #	4-Way 3-Pos. [4]	3-Way 3-Pos. [3]	4-Way 3-Pos. Free Flow Spool [F]	4-Way 4-Pos. Float Assembly [K4]	1/2" NPT Work Ports [50]	SAE 8 Work Ports [08]	SAE 10 Work Ports [10]	Spring Return to Neutral	Internal Hydraulic Detent Release Set @ 2000 PSI [K0]	12VDC Solenoid (External Pilot Design) [SOL-E]	Hydraulic Remote Spool Actuator [HRO]	Rotary Spool Actuator [W]	3-Pos. Detent [D]	Stainless Steel Spool [SS]	24 VDC Solenoid (External Pilot Design) [SOL-E]
1	20-50-04	8650-021	•				•			•							
2	20-08-04	13650-148	•					•		•							
3	20-10-04	8650-020	•						•	•							
4	20-50-F4	8650-019			•		•			•							
5	20-08-F4	13650-151			•			•		•							
6	20-10-F4	8650-018			•				•	•							
7	20-50-03	8650-017		•			•			•							
8	20-08-03	13650-149		•				•		•							
9	20-10-03	8650-016		•					•	•							
10	20-50-K4	8650-015				•	•										
11	20-08-K4	13650-150				•		•									
12	20-10-K4	8650-014				•			•								
13	20-10-04-SOL-E-12	8650-013	•						•			•					
14	20-10-04-SOL-E-24	13650-279	•						•	•							•
15	20-10-03-SOL-E-12	13650-280		•					•	•		•					
16	20-10-03-SOL-E-24	13650-278		•					•	•							•
17	20-10-04-HRO*	8650-578	•						•				•				
18	20-10-K04-2000	8650-011	•						•		•						
19	20-10-W4*	8650-010	•						•					•			
20	20-10-DF4	8650-009			•				•						•		
21	20-10-W4-SS*	8650-638	•						•					•		•	
22	20-10-WF4-SS*	8650-639			•				•					•		•	
23	20-10-F4-SOL-E-24	13650-530			•				•								•
24	20-10-F4-SOL-E-12	13650-529			•				•			•					
25	20-08-DF4	13650-838			•			•							•		

*Bracket Assembly not furnished with Rotary Spool Option (W) Items 19, 21 & 22 or Hydraulic Remote Spool Actuator (HRO) Item 17.



Model V20P

Solenoid Control
(SOL-E)
8072 & 10954Hydraulic Remote Control
(HRO)

V20RP PARALLEL WORK SECTIONS (Housing No. 10954)

Bracket assembly included. Includes load checks where applicable.

Item No.	Order Code	Bill of Material #	Reduced Pressure Drop Section [RP]	SAE 10 Ports [10]	SAE 12 Ports [12]	3-Way 3-Pos [3]	4-Way 3-Position [4]	4-Way 3-Position Free Flow [F4]	4-Way 3-Position Detent Free Flow [DF]	4-Way 4-Position Float [K]	Spring Return to Neutral	"R" Type Detent [R]	Internal Pilot Thru-Passage [PILOT]
1	20R-10-R3	13650-855	•	•		•						•	
2	20R-10-03	13650-856	•	•		•					•		
3	20R-12-03	13650-857	•		•	•					•		
4	20R-12-R3	13650-858	•		•	•						•	
5	20R-10-04	8650-613	•	•			•				•		
6	20R-12-04	13650-859	•		•		•				•		
7	20R-10-F4	13650-276	•	•				•			•		
8	20R-12-F4	13650-860	•		•			•			•		
9	20R-10-DF4	13650-861	•	•					•				
10	20R-10-K4	13650-862	•	•						•			
11	20R-10-04-PILOT	13650-863	•	•			•				•		•

NOTE: The "Pilot" code designates that the internal pilot through-passages have been machined for use when intermixing solenoid and manual sections.



Model V20R
10954 Section)

V20T and V20RT TANDEM WORK SECTIONS (Housing No.'s 8112 & 10762)

Item No.	Order Code	Bill of Material #	Tandem Circuit Section [T]	Reduced Pressure Drop Section [RT]	SAE 10 Ports [10]	SAE 12 Ports [12]	3-Way 3-Pos [3]	4-Way 3-Position [4]	Spring Return to Neutral	4-Way 3-Position Free Flow [F4]	4-Way 4-Position Float [K]	"R" Type Detent [R]
1	20T-10-03	13650-851	•		•		•		•			
2	20T-10-R3	13650-852	•		•		•					•
3	20RT-12-R3	13650-853		•		•	•					•
4	20T-10-04	8650-008	•		•			•	•			
5	20RT-10-04	8650-614		•	•			•	•			
6	20RT-10-K4	13650-854		•	•						•	
7	20RT-10-04-PILOT	13650-943		•	•			•	•			

NOTE: V20T and V20RT (Tandem) sections may be stacked with V20 (Parallel) sections. Refer to V20T product literature for stacking sequence restrictions.



Model V20T
(8112 Section)



Model V20RT
(10762 Section)

V20S SERIES WORK SECTIONS (Housing No. 11483)

Item No.	Order Code	Bill of Material #	Series Circuit Section [S]	SAE 10 Ports [10]	4-Way 3-Pos. [4]	4-Way 3-Pos. Free Flow [F4]	Spring Return to Neutral	4-Way 4-Pos. Float [K4]
1	20S-10-04	8650-637	•	•	•		•	
2	20S-10-F4	13650-850	•	•		•	•	
3	20S-10-K4	8650-640	•	•				•

NOTE: V20S (Series) sections may be stacked with V20P (Parallel) and V20 T (Tandem) sections. Refer to V20S product literature for stacking sequence restrictions.



Model V20S
(11483 Section)



Model V20LO
(11571 Section)

V20LO LOCKOUT WORK SECTIONS (Housing No. 11571)

Item No.	Order Code	Bill of Material #	Pilot Operated Check Section [LO]	SAE 10 Ports [10]	3-Way 3-Pos. [3]	4-Way 3-Pos. [4]	Spring Return To Neutral
1	20-10-L03	13650-864	•	•	•		•
2	20-10-L04	8650-007	•	•		•	•

NOTE: V20S (Series) sections may be stacked with V20P (Parallel) and V20T (Tandem) sections. Refer to V20S product literature for stacking sequence restrictions.



Model V20C
(8364 Section)

V20C CLOSED CENTER WORK SECTIONS (Housing No. 8364)

Item No.	Order Code	Bill of Material #	Closed Circuit Section [C]	SAE 10 Ports [10]	3-Way 3-Position [3]	4-Way 3-Position [4]	Spring Return to Neutral	4-Way 3-Position Free Flow [F4]	4-Way 3-Position Detent Free Flow [DF4]	4-Way 4-Position Float [K]	R-Type Detented [4]	Internal Pilot-Thru Passage [PILOT]
1	20C-10-R3	13650-839	•	•	•						•	
2	20C-10-04	8650-006	•	•		•	•					
3	20C-10-F4	13650-840	•	•			•	•				
4	20C-10-DF4	13650-841	•	•					•			
5	20C-10-K4	13650-842	•	•						•		
6	20C-10-04-PILOT	13650-843	•	•		•	•					•

NOTE: The "Pilot" code designates that the internal pilot through-passages have been machined for use when intermixing solenoid and manual sections.

V20LS LOAD SENSING WORK SECTIONS (Housing No. 8364)



Model V20LS
(8364 Section)

Item No.	Order Code	Bill of Material #	Load Sensing Section [LS]	SAE 10 Ports [10]	SAE 12 Ports [12]	3-Way 3-Pos [3]	4-Way 3-Pos [4]	Spring Return to Neutral	4-Way 3-Pos Free Flow [F4]	4-Way 3-Pos Detent Free Flow [DF4]	4-Way 4-Pos Float [K]	"R" Type Detent [R]	O-Ring C'bores Only Machined [CBORES]	Internal Pilot Thru-Passage [PILOT]
1	20LS-10-03	13650-844	•	•		•		•						
2	20LS-12-03	13650-575	•		•	•		•						
3	20LS-10-R3	13650-572	•	•		•						•		
4	20LS-12-R3	13650-954	•		•	•						•		
5	20LS-10-04	8650-005	•	•			•	•						
6	20LS-12-04	13650-576	•		•		•	•						
7	20LS-10-F4	13650-277	•	•				•	•					
8	20LS-12-F4	13650-845	•		•			•	•					
9	20LS-10-DF4	13650-846	•	•						•				
10	20LS-12-DF4	13650-847	•		•					•				
11	20LS-10-K4	13650-848	•	•							•			
12	20LS-12-K4	13650-849	•		•						•			
13	20LS-10-04-CBORE	13650-574	•	•			•	•					•	
14	20LS-10-04-PILOT	13650-170	•	•			•	•						•

NOTES: The "Cbores" code designates that the pilot seal counterbores have been machined into the upstream side of the work section. This section must be used as the first manual section in V20 valve assemblies using an upstream Unloading Utility Section when having V20LS solenoid and manual sections downstream.

The "Pilot" code designates that the internal pilot through-passages have been machined for use when intermixing solenoid and manual sections.

V20PC PRESSURE COMPENSATED WORK SECTIONS (Housing No. 8364)

(Manually-Operated)

Load Checks not available with V20PC Work Sections.

Item No.	Order Code	Bill of Material #	Closed Center/ Load Sensing [LS]*	4-Way 3-Pos. [04]	3-Way 3-Pos. [03]	4-Way 3-Pos. Free Flow [F4]	2-Way 2-Pos. [2]	SAE 10 Work Ports [10]	Maximum Flow Rate (GPM)		
									[05]	[10]	[15]
1	20PC-LS-10-04-05	13650-001	•	•				•	•		
2	20PC-LS-10-04-10	13650-002	•	•				•		•	
3	20PC-LS-10-04-15	13650-003	•	•				•			•
4	20PC-LS-10-03-05	13650-004	•		•			•	•		
5	20PC-LS-10-03-10	13650-005	•		•			•		•	
6	20PC-LS-10-03-15	13650-006	•		•			•			•
7	20PC-LS-10-F4-05	13650-007	•			•		•	•		
8	20PC-LS-10-F4-10	13650-008	•			•		•		•	
9	20PC-LS-10-F4-15	13650-009	•			•		•			•

* Load sensing sections may be used for closed center or load sensing applications. When used for non-load sensing applications, the load sensing passage must be blocked off at the right outlet cover.

V20PC PRESSURE COMPENSATED WORK SECTIONS (Housing No. 8364)

Solenoid-Operated (Proportional-EPC)

Load Checks not available with V20PC Work Sections.

Item No.	Order Code	Bill of Material #	Closed Center/ Load Sensing [LS]*	4-Way 3-Pos. [04]	3-Way 3-Pos. [03]	4-Way 3-Pos. Free Flow [F4]	2-Way 2-Pos. [2]	2-Way 2-Pos. Free Flow [F2]	SAE 10 Work Ports [10]	SAE 10 Ports [10]	SAE 12 Ports [12]	Maximum Flow Rate (GPM)			12 VDC EPC Actuator [EPC-I]	24VDC EPC Actuator [EPC-II]
												[05]	[10]	[15]		
1	20PC-LS-10-04-05-EPC-I-12	13650-010	•	•					•			•			•	
2	20PC-LS-10-04-10-EPC-I-12	13650-011	•	•					•				•		•	
3	20PC-LS-10-04-15-EPC-I-12	13650-012	•	•					•					•	•	
4	20PC-LS-10-03-05-EPC-I-12	13650-013	•		•				•			•			•	
5	20PC-LS-10-03-10-EPC-I-12	13650-014	•		•				•				•		•	
6	20PC-LS-10-03-15-EPC-I-12	13650-015	•		•				•					•	•	
7	20PC-LS-10-F4-05-EPC-I-12	13650-016	•			•			•			•			•	
8	20PC-LS-10-F4-10-EPC-I-12	13650-017	•			•			•				•		•	
9	20PC-LS-10-F4-15-EPC-I-12	13650-018	•			•			•					•	•	
10	20PC-LS-10-02-05-EPC-I-12	13650-058	•				•			•		•			•	
11	20PC-LS-10-02-10-EPC-I-12	13650-059	•				•			•			•		•	
12	20PC-LS-10-02-15-EPC-I-12	13650-060	•				•			•				•	•	
13	20PC-LS-12-02-15-EPC-I-12	13650-865	•				•				•			•	•	
14	20PC-LS-10-F2-05-EPC-I-12	13650-866	•					•		•		•			•	
15	20PC-LS-10-F2-10-EPC-I-12	13650-867	•					•		•			•		•	
16	20PC-LS-10-F2-15-EPC-I-12	13650-868	•					•		•				•	•	

* Load sensing sections may be used for closed center or load sensing applications. When used for non-load sensing applications, the load sensing passage must be blocked off at the right outlet cover.

** Because of the internal pilot porting, EPC sections must be stacked directly upstream from the utility section.

V20PC PRESSURE COMPENSATED WORK SECTIONS (Housing No. 8364), Continued

Solenoid-Operated (Proportional-EPC)

Load Checks not available with V20PC Work Sections.

Item No.	Order Code	Bill of Material #	Closed Center/ Load Sensing [LS]*	4-Way 3-Pos. [04]	3-Way 3-Pos. [03]	4-Way 3-Pos. Free Flow [F4]	2-Way 2-Pos. [2]	2-Way 2-Pos. Free Flow [F2]	SAE 10 Work Ports [10]	SAE 10 Ports [10]	SAE 12 Work Ports [12]	Maximum Flow Rate (GPM)			12 VDC EPC Actuator [EPC-I]	24VDC EPC Actuator [EPC-I]
												[05]	[10]	[15]		
17	20PC-LS-12-F2-15-EPC-I-12	13650-869	•					•			•			•	•	
18	20PC-LS-10-02-05-EPC-I-24	13650-195	•				•		•			•				•
19	20PC-LS-10-02-10-EPC-I-24	13650-196	•				•		•				•			•
20	20PC-LS-10-02-15-EPC-I-24	13650-197	•				•		•					•		•
21	20PC-LS-10-04-05-EPC-I-24	13650-198	•	•					•			•				•
22	20PC-LS-10-04-10-EPC-I-24	13650-199	•	•					•				•			•
23	20PC-LS-10-04-15-EPC-I-24	13650-200	•	•					•					•		•
24	20PC-LS-10-03-05-EPC-I-24	13650-201	•		•				•			•				•
25	20PC-LS-10-03-10-EPC-I-24	13650-202	•		•				•				•			•
26	20PC-LS-10-03-15-EPC-I-24	13650-203	•		•				•					•		•
27	20PC-LS-10-F4-05-EPC-I-24	13650-204	•			•			•			•				•
28	20PC-LS-10-F4-10-EPC-I-24	13650-205	•			•			•				•			•
29	20PC-LS-10-F4-15-EPC-I-24	13650-206	•			•			•					•		•

* Load sensing sections may be used for closed center or load sensing applications. When used for non-load sensing applications, the load sensing passage must be blocked off at the right outlet cover.

** Because of the internal pilot porting, EPC sections must be stacked directly upstream from the utility section.

V20PC PRESSURE COMPENSATED WORK SECTIONS (Housing No. 8364)

Solenoid-Operated (On/Off-SOL)

Load Checks not available with V20PC Work Sections.

Item No.	Order Code	Bill of Material #	Closed Center/ Load Sensing [LS]*	4-Way 3-Pos. [04]	3-Way 3-Pos. [03]	4-Way 3-Pos. Free Flow [F4]	2-Way 2-Pos. [2]	SAE 10 Work Ports [10]	Maximum Flow Rate (GPM)			12 VDC On/off SOL [SOL-I]	24 VDC On/off SOL [SOL-I]
									[05]	[10]	[15]		
1	20PC-LS-10-04-05-SOL-I-24	13650-207	•	•				•	•				•
2	20PC-LS-10-04-10-SOL-I-24	13650-208	•	•				•		•			•
3	20PC-LS-10-04-15-SOL-I-24	13650-209	•	•				•			•		•
4	20PC-LS-10-03-05-SOL-I-24	13650-210	•		•			•	•				•
5	20PC-LS-10-03-10-SOL-I-24	13650-211	•		•			•		•			•
6	20PC-LS-10-03-15-SOL-I-24	13650-212	•		•			•			•		•
7	20PC-LS-10-F4-05-SOL-I-24	13650-213	•			•		•	•				•
8	20PC-LS-10-F4-10-SOL-I-24	13650-214	•			•		•		•			•
9	20PC-LS-10-F4-15-SOL-I-24	13650-215	•			•		•			•		•
10	20PC-LS-10-04-05-SOL-I-12	13650-061	•	•				•	•			•	
11	20PC-LS-10-04-10-SOL-I-12	13650-062	•	•				•		•		•	

* Load sensing sections may be used for closed center or load sensing applications. When used for non-load sensing applications, the load sensing passage must be blocked off at the right outlet cover.

** Because of the internal pilot porting, SOL sections must be stacked directly upstream from the utility section.

V20PC PRESSURE COMPENSATED WORK SECTIONS (Housing No. 8364), Continued

Solenoid-Operated (On/Off-Sol)

Load Checks not available with V20 PC Work Sections.

Item No.	Order Code	Bill of Material #	Closed Center/ Load Sensing [LS]*	4-Way 3-Pos. [04]	3-Way 3-Pos. [03]	4-Way 3-Pos. Free Flow [F4]	2-Way 2-Pos. [2]	SAE 10 Work Ports [10]	Maximum Flow Rate (GPM)			12 VDC On/off SOL [SOL-I]	24 VDC On/off SOL [SOL-I]
									[05]	[10]	[15]		
12	20PC-LS-10-04-15-SOL-I-12	13650-063	•	•				•			•	•	
13	20PC-LS-10-03-05-SOL-I-12	13650-064	•		•			•	•			•	
14	20PC-LS-10-03-10-SOL-I-12	13650-065	•		•			•		•		•	
15	20PC-LS-10-03-15-SOL-I-12	13650-066	•		•			•			•	•	
16	20PC-LS-10-F4-05-SOL-I-12	13650-067	•			•		•	•			•	
17	20PC-LS-10-F4-10-SOL-I-12	13650-068	•			•		•		•		•	
18	20PC-LS-10-F4-15-SOL-I-12	13650-069	•			•		•			•	•	

* Load sensing sections may be used for closed center or load sensing applications. When used for non-load sensing applications, the load sensing passage must be blocked off at the right outlet cover.

** Because of the internal pilot porting, SOL sections must be stacked directly upstream from the utility section.

V20PC PRESSURE COMPENSATED WORK SECTIONS (Housing No. 8364)

Solenoid-Operated (EPC Proportional With Handle)

Load Checks not available with V20 PC Work Sections.

Item No.	Order Code	Bill of Material #	Closed Center/ Load Sensing [LS]*	4-Way 3-Pos. [04]	3-Way 3-Pos. [03]	4-Way 3-Pos. Free Flow [F4]	2-Way 2-Pos. [2]	SAE 10 Work Ports [10]	Maximum Flow Rate (GPM)			12 VDC EPC with Handle [EPC-IH-12]	24VDC EPC with Handle [EPC-IH-24]
									[05]	[10]	[15]		
1	20PC-LS-10-04-05-EPC-IH-12	13650-225	•	•				•	•			•	
2	20PC-LS-10-04-10-EPC-IH-12	13650-226	•	•				•		•		•	
3	20PC-LS-10-04-15-EPC-IH-12	13650-227	•	•				•			•	•	
4	20PC-LS-10-03-05-EPC-IH-12	13650-228	•		•			•	•			•	
5	20PC-LS-10-03-10-EPC-IH-12	13650-229	•		•			•		•		•	
6	20PC-LS-10-03-15-EPC-IH-12	13650-230	•		•			•			•	•	
7	20PC-LS-10-F4-05-EPC-IH-12	13650-231	•			•		•	•			•	
8	20PC-LS-10-F4-10-EPC-IH-12	13650-232	•			•		•		•		•	
9	20PC-LS-10-F4-15-EPC-IH-12	13650-233	•			•		•			•	•	
10	20PC-LS-10-04-05-EPC-IH-24	13650-252	•	•				•	•				•
11	20PC-LS-10-04-10-EPC-IH-24	13650-253	•	•				•		•			•
12	20PC-LS-10-04-15-EPC-IH-24	13650-254	•	•				•			•		•
13	20PC-LS-10-03-05-EPC-IH-24	13650-255	•		•			•	•				•
14	20PC-LS-10-03-10-EPC-IH-24	13650-256	•		•			•		•			•
15	20PC-LS-10-03-15-EPC-IH-24	13650-257	•		•			•			•		•
16	20PC-LS-10-F4-05-EPC-IH-24	13650-258	•			•		•	•				•

* Load sensing sections may be used for closed center or load sensing applications. When used for non-load sensing applications, the load sensing passage must be blocked off at the right outlet cover.

** Because of the internal pilot porting, EPC sections must be stacked directly upstream from the utility section.

V20PC PRESSURE COMPENSATED WORK SECTIONS (Housing No. 8364), Continued

Solenoid-Operated (EPC Proportional With Handle)

Load Checks not available with V20 PC Work Sections.

Item No.	Order Code	Bill of Material #	Closed Center/ Load Sensing [LS]*	4-Way 3-Pos. [04]	3-Way 3-Pos. [03]	4-Way 3-Pos. Free Flow [F4]	2-Way 2-Pos. [2]	SAE 10 Work Ports [10]	Maximum Flow Rate (GPM)			12 VDC EPC with Handle [EPC-IH-12]	24 VDC EPC with Handle [EPC-IH-24]
									[05]	[10]	[15]		
17	20PC-LS-10-F4-10-EPC-IH-24	13650-259	•			•		•		•			•
18	20PC-LS-10-F4-15-EPC-IH-24	13650-260	•			•		•			•		•

* Load sensing sections may be used for closed center or load sensing applications. When used for non-load sensing applications, the load sensing passage must be blocked off at the right outlet cover.

** Because of the internal pilot porting, EPC sections must be stacked directly upstream from the utility section.

V20PC PRESSURE COMPENSATED WORK SECTIONS (Housing No. 8364)

Solenoid-Operated (On/Off SOL With Handle)

Load Checks not available with V20 PC Work Sections.

Item No.	Order Code	Bill of Material #	Closed Center/ Load Sensing [LS]*	4-Way 3-Pos. [04]	3-Way 3-Pos. [03]	4-Way 3-Pos. Free Flow [F4]	2-Way 2-Pos. [2]	SAE 10 Work Ports [10]	Maximum Flow Rate (GPM)			12 VDC SOL with Handle [SOL-IH-12]	24 VDC SOL with Handle [SOL-IH-24]
									[05]	[10]	[15]		
1	20PC-LS-10-04-05-SOL-IH-12	13650-234	•	•				•	•			•	
2	20PC-LS-10-04-10-SOL-IH-12	13650-235	•	•				•		•		•	
3	20PC-LS-10-04-15-SOL-IH-12	13650-236	•	•				•			•	•	
4	20PC-LS-10-03-05-SOL-IH-12	13650-237	•		•			•	•			•	
5	20PC-LS-10-03-10-SOL-IH-12	13650-238	•		•			•		•		•	
6	20PC-LS-10-03-15-SOL-IH-12	13650-239	•		•			•			•	•	
8	20PC-LS-10-F4-05-SOL-IH-12	13650-240	•			•		•	•			•	
9	20PC-LS-10-F4-10-SOL-IH-12	13650-241	•			•		•		•		•	
10	20PC-LS-10-F4-15-SOL-IH-12	13650-242	•			•		•			•	•	
11	20PC-LS-10-04-05-SOL-IH-24	13650-261	•	•				•	•				•
12	20PC-LS-10-04-10-SOL-IH-24	13650-262	•	•				•		•			•
13	20PC-LS-10-04-15-SOL-IH-24	13650-263	•	•				•			•		•
14	20PC-LS-10-03-05-SOL-IH-24	13650-264	•		•			•	•				•
15	20PC-LS-10-03-10-SOL-IH-24	13650-265	•		•			•		•			•
16	20PC-LS-10-03-15-SOL-IH-24	13650-266	•		•			•			•		•
17	20PC-LS-10-F4-05-SOL-IH-24	13650-267	•			•		•	•				•
18	20PC-LS-10-F4-10-SOL-IH-24	13650-268	•			•		•		•			•
19	20PC-LS-10-F4-15-SOL-IH-24	13650-269	•			•		•			•		•

* Load sensing sections may be used for closed center or load sensing applications. When used for non-load sensing applications, the load sensing passage must be blocked off at the right outlet cover.

** Because of the internal pilot porting, SOL sections must be stacked directly upstream from the utility section.

V20RP PARALLEL SOLENOID WORK SECTIONS (Housing No. 10954)

Solenoid-Operated (On/Off-SOL)
(V20-SOL-I internal pilot porting design).

Item No.	Order Code	Bill of Material #	Parallel Circuit	Closed Center/ Load Sensing [LS*]	4-Way 3-Pos. [04]	3-Way 3-Pos. [03]	4-Way 3-Pos. Free Flow [F4]	SAE 10 Work Ports [10]	SAE 12 Work Ports [12]	24VDC On-off SOL Actuator [SOL-I]	12VDC On-off SOL Actuator [SOL-I]
1	20-10-04-SOL-I-12	8650-986	•		•			•			•
2	20-10-03-SOL-I-12	8650-988	•			•		•			•
3	20-10-F4-SOL-I-12	8650-990	•				•	•			•
4	20-10-04-SOL-I-24	13650-177	•		•			•		•	
5	20-10-03-SOL-I-24	13650-179	•			•		•		•	
6	20-10-F4-SOL-I-24	13650-181	•				•	•		•	
7	20-12-03-SOL-I-12	13650-879	•			•			•		•
8	20-12-04-SOL-I-12	13650-880	•		•				•		•
9	20-12-F4-SOL-I-12	13650-881	•				•		•		•

Letter code "I" stands for internal porting.
Because of internal pilot porting, these sections must be stacked directly upstream from the utility section.

V20RT TANDEM SOLENOID WORK SECTIONS (Housing No. 10762)

Solenoid-Operated (On/Off-SOL)
(V20-SOL-I internal pilot porting design).

Item No.	Order Code	Bill of Material #	Parallel Circuit	Tandem Circuit [T]	SAE 10 Ports [10]	SAE 12 Ports [12]	3-Way 3-Pos. [03]	4-Way 3-Pos. [04]	4-Way 3-Pos. Free Flow [F4]	12VDC On-off SOL Actuator [SOL-I-12]	24VDC On-off SOL Actuator [SOL-I-24]
1	20T-10-03-SOL-I-12	13650-870		•	•		•			•	
2	20T-12-03-SOL-I-12	13650-871		•		•	•			•	
3	20T-10-03-SOL-I-24	13650-872		•	•		•				•
4	20T-10-04-SOL-I-12	13650-873		•	•			•		•	
5	20T-12-04-SOL-I-12	13650-874		•		•		•		•	
6	20T-10-04-SOL-I-24	13650-875		•	•			•			•
7	20T-10-F4-SOL-I-12	13650-876		•	•				•	•	
8	20T-12-F4-SOL-I-12	13650-877		•		•			•	•	
9	20T-10-F4-SOL-I-24	13650-878		•	•				•		•

Letter code "I" stands for internal porting.
Because of internal pilot porting, these sections must be stacked directly upstream from the utility section.

V20RP PARALLEL SOLENOID WORK SECTIONS (Housing No. 10954)

Solenoid-Operated (Proportional-EPC)
(V20-SOL-I internal pilot porting design).

Item No.	Order Code	Bill of Material #	Parallel Circuit	Closed Center/ Load Sensing [LS*]	4-Way 3-Pos. [04]	3-Way 3-Pos. [03]	4-Way 3-Pos. Free Flow [F4]	SAE 10 Work Ports [10]	SAE 12 Work Ports [12]	12VDC EPC Actuator [EPC-I-12]	24VDC EPC Actuator [EPC-I-24]
1	20-10-04-EPC-I-12	8650-987	•		•			•		•	
2	20-10-03-EPC-I-12	8650-989	•			•		•		•	
3	20-10-F4-EPC-I-12	8650-991	•				•	•		•	
4	20-10-04-EPC-I-24	13650-178	•		•			•			•
5	20-10-03-EPC-I-24	13650-180	•			•		•			•
6	20-10-F4-EPC-I-24	13650-182	•				•	•			•
7	20-12-03-EPC-I-12	13650-891	•			•			•	•	
8	20-12-04-EPC-I-12	13650-892	•		•				•	•	
9	20-12-F4-EPC-I-12	13650-893	•				•		•	•	

Letter code "I" stands for internal porting.

Because of internal pilot porting, these sections must be stacked directly upstream from the utility section.

V20RT TANDEM SOLENOID WORK SECTIONS (Housing No. 10762)

Solenoid-Operated (Proportional-EPC)
(V20-EPC-I internal pilot porting design).

Item No.	Order Code	Bill of Material #	Parallel Circuit	Tandem Circuit [T]	SAE 10 Ports [10]	SAE 12 Ports [12]	3-Way 3-Pos. [03]	4-Way 3-Pos. [04]	4-Way 3-Pos. Free Flow [F4]	12VDC EPC [EPC-I-12]	24VDC EPC [EPC-I-24]
1	20T-10-03-EPC-I-12	13650-882		•	•		•			•	
2	20T-12-03-EPC-I-12	13650-883		•		•	•			•	
3	20T-10-03-EPC-I-24	13650-884		•	•		•				•
4	20T-10-04-EPC-I-12	13650-885		•	•			•		•	
5	20T-12-04-EPC-I-12	13650-925		•		•		•		•	
6	20T-10-04-EPC-I-24	13650-926		•	•			•			•
7	20T-10-F4-EPC-I-12	13650-927		•	•				•	•	
8	20T-12-F4-EPC-I-12	13650-889		•		•			•	•	
9	20T-10-F4-EPC-I-24	13650-890		•	•				•		•

Letter code "I" stands for internal porting.

Because of internal pilot porting, these sections must be stacked directly upstream from the utility section.

V20LS CLOSED CENTER AND LOAD SENSING SOLENOID WORK SECTIONS (Housing No. 8364)

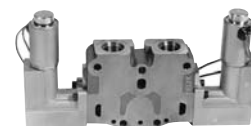
Solenoid-Operated (On/Off-SOL)

(V20-SOL-I internal pilot porting design).

Item No.	Order Code	Bill of Material #	Open Center	Closed Center/ Load Sensing [LS*]	4-Way 3-Pos. [04]	3-Way 3-Pos. [03]	4-Way 3-Pos. Free Flow [F4]	SAE 10 Work Ports [10]	24VDC On-off SOL Actuator [SOL-I]	12VDC On-off SOL Actuator [SOL-I]
1	20LS-10-04-SOL-I-12	8650-992		•	•			•		•
2	20LS-10-03-SOL-I-12	8650-994		•		•		•		•
3	20LS-10-F4-SOL-I-12	8650-996		•			•	•		•
4	20LS-10-04-SOL-I-24	13650-216		•	•			•	•	
5	20LS-10-03-SOL-I-24	13650-218		•		•		•	•	
6	20LS-10-F4-SOL-I-24	13650-220		•			•	•	•	

Letter code "I" stands for internal porting.

Because of internal pilot porting, these sections must be stacked directly upstream from the utility section. *Load Sensing sections may be used for Closed Center or Load Sensing applications. When used for non-load sensing applications, the load sensing passage must be blocked off at the right outlet cover.



V20 EPC Load Sensing Valve

V20LS CLOSED CENTER AND LOAD SENSING SOLENOID WORK SECTIONS (Housing No. 8364)

Solenoid-Operated (Proportional-EPC)

(V20-EPC-I internal pilot porting design).

Item No.	Order Code	Bill of Material #	Open Center	Closed Center/ Load Sensing [LS*]	4-Way 3-Pos. [04]	3-Way 3-Pos. [03]	4-Way 3-Pos. Free Flow [F4]	SAE 10 Work Ports [10]	24VDC On-off Solenoid Actuator [SOL-I]	12VDC On-off Solenoid Actuator [SOL-I]	12 VDC EPC Actuator [EPC-I-12]	24VDC EPC Actuator [EPC-I-24]
1	20LS-10-04-EPC-I-12	8650-993		•	•			•			•	
2	20LS-10-03-EPC-I-12	8650-995		•		•		•			•	
3	20LS-10-F4-EPC-I-12	8650-997		•			•	•			•	
4	20LS-10-04-EPC-I-24	13650-217		•	•			•				•
5	20LS-10-03-EPC-I-24	13650-219		•		•		•				•
6	20LS-10-F4-EPC-I-24	13650-221		•			•	•				•

Letter code "I" stands for internal porting.

Because of internal pilot porting, these sections must be stacked directly upstream from the utility section. *Load Sensing sections may be used for Closed Center or Load Sensing applications. When used for non-load sensing applications, the load sensing passage must be blocked off at the right outlet cover.

V20RP PARALLEL SOLENOID WORK SECTIONS (Housing No. 10954)

Solenoid-Operated (On/Off) With Handle
(V20-SOL-I internal pilot porting design).

Item No.	Order Code	Bill of Material #	Open Center	Closed Center/ Load Sensing [LS*]	4-Way 3-Pos. [04]	3-Way 3-Pos. [03]	4-Way 3-Pos. Free Flow [F4]	SAE 10 Work Ports [10]	SAE 12 Work Ports [12]	12VDC SOL with Handle [SOL-IH-12]	24VDC SOL with Handle [SOL-IH-24]
1	20-10-04-SOL-IH-12	13650-183	•		•			•		•	
2	20-10-03-SOL-IH-12	13650-185	•			•		•		•	
3	20-10-F4-SOL-IH-12	13650-187	•				•	•		•	
4	20-10-04-SOL-IH-24	13650-189	•		•			•			•
5	20-10-03-SOL-IH-24	13650-191	•			•		•			•
6	20-10-F4-SOL-IH-24	13650-193	•				•	•			•
7	20-12-03-SOL-IH-12	13650-903	•			•			•	•	
8	20-12-04-SOL-IH-12	13650-904	•		•				•	•	
9	20-12-F4-SOL-IH-12	13650-905	•				•		•	•	

Letter code "I" stands for internal porting.

Letter code "H" stands for manual lever assembly.

Because of internal pilot porting, these sections must be stacked directly upstream from the utility section.

V20RT TANDEM SOLENOID WORK SECTIONS (Housing No. 10762)

Solenoid-Operated (On/Off) With Handle
(V20-SOL-I internal pilot porting design).

Item No.	Order Code	Bill of Material #	Parallel Circuit	Tandem Circuit [T]	SAE 10 Ports [10]	SAE 12 Ports [12]	3-Way 3-Pos. [03]	4-Way 3-Pos. [04]	4-Way 3-Pos. Free Flow [F4]	12VDC SOL with Handle [SOL-IH-12]	24VDC SOL with Handle [SOL-IH-24]
1	20T-10-03-SOL-IH-12	13650-894		•	•		•			•	
2	20T-12-03-SOL-IH-12	13650-895		•		•	•			•	
3	20T-10-03-SOL-IH-24	13650-896		•	•		•				•
4	20T-10-04-SOL-IH-12	13650-897		•	•			•		•	
5	20T-12-04-SOL-IH-12	13650-898		•		•		•		•	
6	20T-10-04-SOL-IH-24	13650-899		•	•			•			•
7	20T-10-F4-SOL-IH-12	13650-900		•	•				•	•	
8	20T-12-F4-SOL-IH-12	13650-901		•		•			•	•	
9	20T-10-F4-SOL-IH-24	13650-902		•	•				•		•

Letter code "I" stands for internal porting.

Letter code "H" stands for manual lever assembly.

Because of internal pilot porting, these sections must be stacked directly upstream from the utility section.

V20RP PARALLEL SOLENOID WORK SECTIONS (Housing No. 10954)

Solenoid-Operated (Proportional-EPC) With Handle
(V20-EPC-I internal pilot porting design).

Item No.	Order Code	Bill of Material #	Open Center	Closed Center/ Load Sensing [LS*]	4-Way 3-Pos. [04]	3-Way 3-Pos. [03]	4-Way 3-Pos. Free Flow [F4]	SAE 10 Work Ports [10]	SAE 12 Work Ports [12]	12VDC EPC with Handle [EPC-IH-12]	24VDC EPC with Handle [EPC-IH-24]
1	20-10-04-EPC-IH-12	13650-184	•		•			•		•	
2	20-10-03-EPC-IH-12	13650-186	•			•		•		•	
3	20-10-F4-EPC-IH-12	13650-188	•				•	•		•	
4	20-10-04-EPC-IH-24	13650-190	•		•			•			•
5	20-10-03-EPC-IH-24	13650-192	•			•		•			•
6	20-10-F4-EPC-IH-24	13650-194	•				•	•			•
7	20-12-03-EPC-IH-12	13650-915				•			•	•	
8	20-12-04-EPC-IH-12	13650-916			•				•	•	
9	20-12-F4-EPC-IH-12	13650-917					•		•	•	

Letter code "I" stands for internal porting.

Letter code "H" stands for manual lever assembly.

Because of internal pilot porting, these sections must be stacked directly upstream from the utility section.

V20RT TANDEM SOLENOID WORK SECTIONS (Housing No. 10762)

Solenoid-Operated (Proportional-EPC) With Handle
(V20-EPC-I internal pilot porting design).

Item No.	Order Code	Bill of Material #	Parallel Circuit	Tandem Circuit [T]	SAE 10 Ports [10]	SAE 12 Ports [12]	3-Way 3-Pos. [03]	4-Way 3-Pos. [04]	4-Way 3-Pos. Free Flow [F4]	12VDC EPC with Handle [EPC-IH-12]	24VDC EPC with Handle [EPC-IH-24]
1	20T-10-03-EPC-IH-12	13650-906		•	•		•			•	
2	20T-12-03-EPC-IH-12	13650-907		•		•	•			•	
3	20T-10-03-EPC-IH-24	13650-908		•	•		•				•
4	20T-10-04-EPC-IH-12	13650-909		•	•			•		•	
5	20T-12-04-EPC-IH-12	13650-910		•		•		•		•	
6	20T-10-04-EPC-IH-24	13650-911		•	•			•			•
7	20T-10-F4-EPC-IH-12	13650-912		•	•				•	•	
8	20T-12-F4-EPC-IH-12	13650-913		•		•			•	•	
9	20T-10-F4-EPC-IH-24	13650-914		•	•				•		•

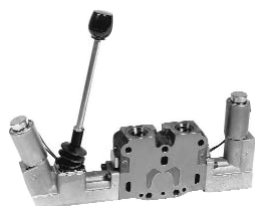
Letter code "I" stands for internal porting.

Letter code "H" stands for manual lever assembly.

Because of internal pilot porting, these sections must be stacked directly upstream from the utility section.

V20LS CLOSED CENTER AND LOAD SENSING SOLENOID WORK SECTIONS (Housing No. 8364)

Solenoid-Operated (On/Off-SOL) With Handle
(V20-SOL-I internal pilot porting design).



V20 Load Sensing Valve
with Handle and Manual Override

Item No.	Order Code	Bill of Material #	Open Center	Closed Center/ Load Sensing [LS*]	4-Way 3-Pos. [04]	3-Way 3-Pos. [03]	4-Way 3-Pos. Free Flow [F4]	SAE 10 Work Ports [10]	12VDC SOL with Handle [SOL-IH-12]	24VDC SOL with Handle [SOL-IH-24]
1	20LS-10-04-SOL-IH-12	13650-243		•	•			•	•	
2	20LS-10-03-SOL-IH-12	13650-245		•		•		•	•	
3	20LS-10-F4-SOL-IH-12	13650-247		•			•	•	•	
4	20LS-10-04-SOL-IH-24	13650-270		•	•			•		•
5	20LS-10-03-SOL-IH-24	13650-272		•		•		•		•
6	20LS-10-F4-SOL-IH-24	13650-274		•			•	•		•

Letter code "I" stands for internal porting.

Letter code "H" stands for manual lever assembly.

Because of internal pilot porting, these sections must be stacked directly upstream from the utility section. *Load Sensing sections may be used for Closed Center or Load Sensing applications. When used for non-load sensing applications, the load sensing passage must be blocked off at the right outlet cover.

V20LS CLOSED CENTER LOAD SENSING SOLENOID WORK SECTIONS (Housing No. 8364)

Solenoid-Operated (Proportional-EPC) With Handle
(V20-EPC-I internal pilot porting design).

Item No.	Order Code	Bill of Material #	Open Center	Closed Center/ Load Sensing [LS*]	4-Way 3-Pos. [04]	3-Way 3-Pos. [03]	4-Way 3-Pos. Free Flow [F4]	SAE 10 Work Ports [10]	12VDC EPC with Handle [EPC-IH-12]	24VDC EPC with Handle [EPC-IH-24]
1	20LS-10-04-EPC-IH-12	13650-244		•	•			•	•	
2	20LS-10-03-EPC-IH-12	13650-246		•		•		•	•	
3	20LS-10-F4-EPC-IH-12	13650-248		•			•	•	•	
4	20LS-10-04-EPC-IH-24	13650-271		•	•			•		•
5	20LS-10-03-EPC-IH-24	13650-273		•		•		•		•
6	20LS-10-F4-EPC-IH-24	13650-275		•			•	•		•

Letter code "I" stands for internal porting.

Letter code "H" stands for manual lever assembly.

Because of internal pilot porting, these sections must be stacked directly upstream from the utility section. *Load Sensing sections may be used for Closed Center or Load Sensing applications. When used for non-load sensing applications, the load sensing passage must be blocked off at the right outlet cover.

V20 TRAVEL LIMITER/MANUAL OVERRIDES

May be added to above Solenoid/EPC positioners

Order Code	Bill of Material #	Description
K-20-MO-P	13650-080	Push type manual override
K-20-TL-MO-S	13650-081	Screw type travel limiter/manual override
K-20-TL-IH	13650-937	Screw type travel limiter for use with Manual Handle option (Handle End only)

Each kit includes one assembly for one end of valve.

UTILITY SECTIONS FOR USE WITH V20 INTERNALLY PILOTED VALVES (Housing No. 7820)

For use with V20 Internally Piloted Solenoid Work Sections. (Not compatible with Externally Piloted Sections)

Order Code	Bill of Material #	Description
20-SOL-I-UT-12	13650-056	Utility Section with 12 VDC On-off Pressure Control Cartridge installed.
20-SOL-I-UT-24	13650-308	Utility Section with 24 VDC On-off Pressure Control Cartridge installed.
20-SOL-I-UT-LS	13650-057	Utility Section for use with closed center/load sensing valve assemblies.
20-SOL-I-UT-MECH	13650-920	Utility Section with Continuous-On Pressure Control Cartridge
20-SOL-I-UT-PB	13650-921	Utility Section for use with SAE #12 Power Beyond Sleeve

Utility Section must be stacked directly upstream from the right outlet cover.



V20 Valve Utility Section

Optional Cartridges for the Utility Section

Order Code	Bill of Material #	Description
K-20-CONT-ON	8650-430	Continuous-On Pressure Control Cartridge
K-20-12-CNTRL	13650-938	12 VDC Pressure Control Cartridge
K-20-24-CNTRL	13650-939	24 VDC Pressure Control Cartridge
K-20-S12-Y	8650-115	Power Beyond Sleeve, SAE 12
K-20-S75-Y	8650-116	Power Beyond Sleeve, 3/4" NPT

UNLOADING UTILITY SECTIONS (Housing No. 22952)

Allows closed center, load sensing and pressure compensated work sections to be used with a fixed displacement pump.

Order Code	Bill of Material #	Description
20-UV-12 LOS	13650-683	V20 Unloading Valve Section without Internal Pilot Pressure (Manual Valves)
20-UV-12-PR-LS	13650-684	V20 Unloader Valve Section with Internal Pilot Pressure (Solenoid Valves)
K-20-UNL-PLUGS	13650-775	Option Plugs for Utility Section with Unloading Valve (See Note 2)

NOTE 1: The Unloading Valve section should be stacked next to the inlet cover unless priority sections are required. When priority is required, install unloading valve section downstream of priority pressure compensated sections. Open center, tandem and parallel sections should be stacked downstream of the unloading valve section.

NOTE 2: A bag of the following parts will be included to cover several application requirements.

Part #	Quantity	Description	} K-20-UNL-PLUGS
21866-001	3	Pilot Hole Seals	
21857-001	2	Section Seals	
21733-001	2	Section Seals	
00017-001	1	1/4" NPTF Plug	
22962-001	3	Expansion Plugs 6 mm	



K-20-SOL-I



K-20-EPC-I

SOLENOID CARTRIDGE ASSEMBLIES

For use with V20-SOL-I and V40 solenoid work sections.

Order Code	Bill of Material #	Description
K-SOL-12-CART	8650-998	12 VDC On-off Cartridge Assembly for Solenoid Positioner
K-EPC-12-CART	8650-999	12 VDC Proportional Cartridge Assembly for EPC Positioner
K-SOL-24-CART	13650-110	24VDC On-Off Cartridge Assembly for Solenoid Positioner
K-EPC-24-CART	13650-111	24VDC Proportional Cartridge Assembly for EPC Positioner

NOTE: These cartridges may be used to convert the above solenoid work sections from on-off to proportional or vice versa.
One cartridge per kit.

Spool Positioner Option Kits

Will not fit Float [F] or Internal Hydraulic Detent Release [KO] Spools.

Order Code	Bill of Material #	Description
K-20-A	8650-104	Spring Extended Spool Positioner Kit
K-20-D	8650-105	3-Position Detent Kit
K-20-R	8650-106	Spool "IN" Detent w/Spring Return to Neutral Positioner Kit
**K-20-SOL-E-12	8650-098	12VDC Solenoid Actuator (External Pilot Design)
**K-20-SOL-E-24	13650-531	24 VDC Solenoid Actuator (External Pilot Design)
K-20-E	8650-119	Electro Magnetic Spool Release Positioner Kit
*K-20-HR	8650-575	Hydraulic Remote Spool Positioner Kit
*K-20-HRO	8650-574	Hydraulic Remote w/Override Spool Positioner Kit
K-20-PA1	8650-630	Pneumatic Spool Positioner Kit
K-20-PA2	8650-631	12V DC Solenoid Operated Pneumatic Spool Positioner Kit

*Contains both Bonnets needed.

**Cannot be used with Float Spool (K4) or Standard Free Flow Spool (F4).

Spool Action Assembly
(Bonnets)

Handle End Options

Handle Kits Contain Necessary Links and Pins.

Order Code	Bill of Material #	Description
K-20-VH-B	8650-151	Vertical Handle (Black)
K-20-VH-P	8650-153	Vertical Handle (Plain)
K-20-HH-B	8650-154	Horizontal Handle (Black)
K-20-HH-P	8650-156	Horizontal Handle (Plain)
K-20-RET	8650-107	Standard Seal Retainer Plate
K-20-RET-HD	8650-108	Heavy Duty Seal Retainer
K-20-WIPER	8650-097	Sec. Spool Wiper
K-20-HBO-CI	8650-113	Complete Bracket (Cast Iron) less Handle and Links
K-20-BOOT	8650-112	Spool Boot Assembly



Vertical Handle Assemblies



Horizontal Handle Assemblies

Standard Section Stud Assembly Kits

Includes Section Seals and Nuts. (Stud Kits Do Not include 21866-001 Load Sensing and Solenoid Pilot Passage Section Seals. These seals must be purchased separately if required.)

Order Code	Bill of Material #	Description
K-20-1	8650-087	One Section
K-20-2	8650-088	Two Section
K-20-3	8650-089	Three Section
K-20-4	8650-090	Four Section
K-20-5	8650-091	Five Section
K-20-6	8650-092	Six Section
K-20-7	8650-093	Seven Section
K-20-8	8650-094	Eight Section
K-20-9	8650-095	Nine Section
K-20-10	8650-096	Ten Section
*K-20-SECT-SEAL	13650-405	Section seal for load sensing and/or solenoid pilot passages.



Stud Assembly Kit

NOTE: When using an 8644 Right End Cover add one section to assure proper stud length.

*Kit includes 25 pieces of seal number 21866-001.

Work Port Options

Includes all necessary Seals.

Model RC
Work Port Relief ValveCRA Combination
Relief Anti-Cavitation
Check ValveAnti-Cavitation
Check Valve

Item No.	Order Code	Bill of Material #	Relief Valve	Combination Relief & Anti-Cav Check	Anti-Cavitation Check Assembly	500-1249 Set @ 1200 PSI c/p	1250-1749 Set @ 1700 PSI c/p	1750 - 1999 Set @ 1950 PSI c/p	2000-2599 Set @ 2550 PSI c/p	500 - 3500 Set @ 2500 PSI c/p
1	RC-1200	8650-394	•			•				
2	RC-1700	8650-395	•				•			
3	RC-1950	8650-396	•					•		
4	RC-2550	8650-397	•						•	
5	RP20A-2500	8650-975	•							•
6	CRA-1200	8650-387		•		•				
7	CRA-1700	8650-388		•			•			
8	CRA-1950	8650-389		•				•		
9	CRA-2550	8650-390		•					•	
10	K-20-AC	8650-380			•					
11	RCS-1200*	8650-632	•			•				
12	RCS-1700*	8650-633	•				•			
13	RCS-1950*	8650-634	•					•		
14	RCS-2550*	8650-635	•						•	
15	K-20-ACS*	8650-636			•					

*For use in V20S Series sections only.

NOTE: All above Relief Valves have stainless steel springs. Crack Pressures (c/p) set at 1 GPM.

RC, CRA, and RCS Relief Valves are internal shim adjustable. RP20A Relief Valve is external screw adjustable.

Work Port Options for use in V20PC Work Sections

(Complete cartridge with all necessary seals.)

Item No.	Order Code	Bill of Material #	Relief Valve	500-1249 Set @ 1200 PSI c/p	1250-1749 Set @ 1700 PSI c/p	1750 - 1999 Set @ 1950 PSI c/p	2000-2599 Set @ 2550 PSI c/p
1	RCPC-1200	13650-930	•	•			
2	RCPC-1700	13650-931	•		•		
3	RCPC-1950	13650-932	•			•	
4	RCPC-2550	13650-933	•				•

Relief Option Kit

Order Code	Bill of Material #	Description
K-WH-A	8650-381	Screw Adjustable Option for RC, CRA and RCS Relief Valves.

V20 MID-INLET AND TRANSITION SECTIONS (Housing No.'s 6825, 12138 & 21243)

Item No.	Order Code	Bill of Material #	Split Flow (SF)	Combined Flow [CF]	SAE 12 Top Inlet [12]	3/4" NPT Top Inlet [75]	SAE 16 Top Inlet [16]	Load Sense and Pilot Drain [LS]	Pressure Reducing Cartridge [PR]	Internal Pilot Thru-Passage [PILOT]
1	20-12-SF	8650-004	•		•					
2	20-12-CF	8650-003		•	•					
3	20-75-SF	8650-002	•			•				
4	20-75-CF	8650-001		•		•				
5	*20/50-16-SF	8650-798	•				•			
6	*20/50-16-CF	8650-797		•			•			
7	20-12-SF-PILOT	13650-918	•		•					•
8	20-12-CF-PILOT	13650-919		•	•					•
9	20/30-TR-16-LS	13650-173		•			•	•		•
10	20/30-TR-16-PR-LS	13650-079		•			•	•	•	•



V20
Mid-Inlet Section

NOTES: All of the above Mid-Inlet and Transition Sections are machined to accept main relief cartridges .

*V20/V50 mid-inlet sections combine V20 work sections (upstream) with V50 work sections (downstream).

Standard V50 section stud kits are used for downstream V50 work sections.

Special V20 section stud kits listed below are used for upstream V20 work sections.

The "Pilot" code designates that the internal pilot passages have been machined through the Mid-Inlet Section. These sections will allow pilot oil to be available to both upstream and downstream sections.

V20/50 Section Stud Assembly Kits

For use with upstream V20 work sections in V20/V50 Mid-Inlet Valve Assemblies. Includes section seals.

Order Code	Bill of Material #	Number of Work Sections
K-20/50-1	8650-800	One Section
K-20/50-2	8650-801	Two Section
K-20/50-3	8650-802	Three Section
K-20/50-4	8650-803	Four Section



V20 Utility Section for
Solenoid Option

Utility Sections For Use With V20 Externally Piloted Valves (Housing No. 7820)

(Not for Use in Internally Piloted Valve Assemblies)

Order Code	Bill of Material #	Description
20-SOL-E-UT-12	8650-031	Utility Section with 12VDC On-off Pressure Control Cartridge Installed.
20-SOL-E-UT-24	13650-309	Utility Section with 24VDC On-off Pressure Control Cartridge Installed.
20-SOL-E-UT-MECH	13650-922	Utility Section with Continuous-On Pressure Control Cartridge
20-SOL-E-UT-PB	13650-923	Utility Section with SAE #12 Power Beyond Sleeve

Options to Utility Section

K-20-SC	8650-114	Closed Center Plug
K-20-S12-Y	8650-115	Power Beyond Sleeve, SAE 12
K-20-S75-Y	8650-116	Power Beyond Sleeve, 3/4" NPT
K-20-CONT-ON	8650-430	Continuous-On Pressure Control Cartridge
K-20-12-CNTRL	13650-938	12VDC Pressure Control Cartridge
K-20-24-CNTRL	13650-928	24VDC Pressure Control Cartridge



External Tubing Kit

External Tubing Kit

K-20-TUBE	8650-086	Tubing assembly between Utility Section and Solenoid Spool Actuator
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*Fitting Kits For Externally Piloted V20 and V42 Solenoid Valves

Order Code	Bill of Material #	Description
K-20-S1	8650-085	For single spool solenoid valve
K-20-S2	8650-082	For First section (closest to valve inlet) in a multi-spool solenoid valve. (Last section for Model V42)
K-20-S3	8650-083	For the center section(s) in a multi-spool solenoid valve.
K-20-S4	8650-084	For the last section (closest to utility section) in a multi-spool solenoid valve. (First section for Model V42)

* Each kit contains one adjustable speed control fitting assembly and one non-adjustable fitting assembly for one actuator assembly.



25P

Directional Control Valves (FOR PARALLEL APPLICATION)

Gresen's Model 25P Directional Control Valve is a stack type valve which allows versatility in porting, assembly of various combinations of the different type working sections, and the addition of working sections in the field as required. 3-way, 4-way, Free Flow, and 4-way 4-position float sections can be combined in assemblies of 1 to 9 spools.

Excellent metering characteristics in raising and lowering positions make this valve an excellent choice for precise control of any implement.

- 35 GPM nominal flow rating
- Pressures to 2500 PSI
- Integral inlet/work and outlet/work sections available. Provide economy and flexibility
- Parallel and Tandem circuit options
- Manual or solenoid actuator options

Specifications

Pressure Rating:

Continuous Operating, Max. 2500 PSI (172,9 bar)

Capacity:

Nominal Flow 35 GPM (133 litres/min)

Operating Temperature: -40°F (-40°C) to 176°F (80°C)

Filtration Required (Min.) 33 micrometre

Maximum Exhaust Core Pressure:

With Handle Bracket or Heavy Duty

Spool Seal Retainer Installed

Continuous Operating 1000 PSI (69,0 bar)

With Standard Spool Seal Retainer

Installed 500 PSI (34,5 bar)

See Page 326 For Ordering Information



8089 Left Cover

25P LEFT COVER (Housing No. 8089)

Two Port Plugs are furnished with each Cover. One Plug is machined for 1/4" NPT gauge port. Gauge port will be plugged. All Left Covers machined to accept Main Relief Cartridges.

Order Code	Bill of Material #	Top Inlet and Outlet	End Inlet and Outlet	1" NPT Ports (100)	SAE 16 Ports (16)
25-LC-100	8650-058	•	•	•	
40-LC-16	8650-057	•	•		•

8089 Left Cover with trepan grooves for use with 25P and V40 Valves

Main Relief Options For 25P, V40 and V42 Inlet Covers

Includes all necessary Seals.

Model KC
Relief Valve CartridgeModel RP60
Relief Valve Cartridge

Order Code	Bill of Material #	Pressure Range, PSI		
		400-1400 Set @ 1100 PSI ϵ/p	1401-2000 Set @ 2000 PSI ϵ/p	500-5000 Set @ 2500 PSI ϵ/p
KC-LP-1100	8650-391	•		
KC-HP-2000	8650-392		•	
RP60A-2500	8650-393			•
K-40-NR	8650-379	No Relief Plug Kit (NR option)		

For use in all 25P, V40 and V42 Inlet Covers

NOTE: KC and RP60A Relief Valves are external screw adjustable.
Crack Pressure set at 1 GPM.

*1644 Right Cover
No trepan grooves, for use
with 25P Valves8090 Right cover
No trepan grooves, for use
with 25P Valves**25P RIGHT COVERS (Housing No.'s 1644 & 8090)**

Order Code	Bill of Material #	End Outlet [E]	Top Outlet [T]	1" NPT Port [100]	SAE 16 Port [16]	End Power Beyond Outlet [E,Y]	Machined for Conversion to Power Beyond or Closed Center [M,Y]
25-RC-100-E	8650-051	•		•			
40-RC-16-E	8650-052	•			•		
25-RC-100-EY	8650-053			•		•	
40-RC-16-EY	8650-054				•	•	
25-RC-100-MY	8650-327		•	•			•
40-RC-16-TMY	8650-328		•		•		•

NOTE: 3/4" NPT plug furnished with 8090 covers for conversion to power beyond.

***1644 Right Cover Identification**

Covers with 1 hole through inner surface are used for Power Beyond or Closed Center
Covers with 2 holes through inner surface (pictured above) are used for Turn Around or Outlet

25P LEFT INTEGRAL SECTION (Housing No.'s 3000 & 3001)

Integral Section Includes Valve Spool and Handle Bracket.

Order Code	Bill of Material #	4-Way 3-Pos. [4]	3-Way 3-Pos. [3]	1" NPT Inlet & Outlet Ports [100]	SAE 16 Inlet & Outlet Ports [16]	3/4" NPT Work Ports [75]	SAE 12 Work Ports [12]	SAE 16 Work Ports [16]	Top Inlet/Outlet [T]	End Inlet/Outlet [E]	Rotary Spool Actuator [UL]	Upper & Lower Work Port Options Machined & Plugged [UL]
25-L-T-100-75-04	8650-372	•		•		•			•			
25-L-T-100-75-UL-04	13650-133	•		•		•			•			•
25-L-T-16-12-UL-04	13650-134	•			•		•		•			•
25-L-T-16-16-04	8650-371	•			•			•	•			
25-L-E-100-75-04	8650-370	•		•		•				•		
25-L-E-100-75-UL-04	13650-131	•		•		•				•		•
25-L-E-16-16-04	8650-369	•			•			•		•		
25-L-E-16-16-UL-04	13650-132	•			•			•		•		•
25-L-E-100-75-W4	8650-641	•		•		•				•	•	
25-L-T-16-16-03	13650-824		•		•			•	•			

NOTE: Machined for Main Relief Options.
Not machined for gauge port.
Bracket Assembly not furnished with Rotary Spool Option [W].



3000 Left Cover



3001 Left Cover

25P RIGHT INTEGRAL SECTION (Housing No. 1624)

Integral Section includes Valve Spool and Handle Bracket.

Order Code	Bill of Material #	4-Way 3-Position [4]	3/4" NPT Work Ports [75]	SAE 16 Work Ports [16]	1" NPT Outlet [100]	SAE 16 Outlet [16]	Upper Work Port Options Machined & Plugged [U]	Machined for Power Beyond [MY]
25-R-75-100-04	8650-368	•	•		•			
25-R-75-100-U-04	13650-135	•	•		•		•	
25-R-75-MY-04	8650-367	•	•		•			•
25-R-16-16-04	8650-366	•		•		•		
25-R-16-MY-04	8650-365	•		•				•
25-R-16-MY-U-04	13650-136	•		•			•	•



1624 Right Integral Section

Option Kits for No. 1624 Section

Order Code	Bill of Material #	Description
K-25-X	8650-109	Conversion Plug Kit
K-25-C	8650-110	Closed Center Plug Kit
K-25-12-Y	8650-081	SAE 12 Power Beyond Sleeve Kit
K-25-75-Y	8650-111	3/4" NPT Power Beyond Sleeve Kit

25P PARALLEL WORK SECTIONS (Housing No. 1614)

Includes Handle Bracket.



1614 3-Way or 4-Way

Item No.	Order Code	Bill of Material #	3-Way 3-Pos. [3]	4-Way 3-Pos. [4]	4-Way 3-Pos. Free Flow [F4]	① 4-Way 4-Pos. Float [K4]	3/4" NPT Work Ports [75]	SAE 10 Work Ports [10]	SAE 12 Work Ports [12]	SAE 16 Work Ports [16]	Upper Work Port Options Machined & Plugged [U]	Upper & Lower Work Port Options Machined & Plugged [UL]	Rotary Spool Actuator [W]	Stainless Steel Spool [SS]
1	25-75-03	13650-120	•				•							
2	25-75-U-03	8650-343	•				•				•			
3	25-12-03	13650-123	•						•					
4	25-12-U-03	13650-128	•						•		•			
5	25-16-U-03	8650-364	•							•	•			
6	25-75-04	8650-341		•			•							
7	25-75-U-04	13650-121		•			•				•			
8	25-75-UL-04	8650-339		•			•					•		
9	25-75-W4	8650-941		•			•						•	
10	25-10-04	8650-615		•				•						
11	25-10-U-04	8650-479		•				•			•			
12	25-12-04	13650-122		•					•					
13	25-12-U-04	13650-129		•					•		•			
14	25-12-UL-04	13650-130		•					•			•		
15	25-16-04	8650-338		•						•				
16	25-16-UL-04	8650-340		•						•		•		
17	25-16-UL-W4-SS	8650-508		•						•		•	•	•
18	25-75-F4	8650-337			•		•							
19	25-12-F4	13650-124			•				•					
20	25-16-F4	8650-342			•					•				
21	25-16-WF4-SS	8650-509			•					•			•	•
22	25-75-K4 ①	8650-333				•	•							
23	25-75-UL-K4 ①	8650-331				•	•					•		
24	25-10-U-K4 ①	8650-480				•		•			•			
25	25-12-K4 ①	13650-125				•			•					
26	25-12-U-K4 ①	13650-126				•			•		•			
27	25-12-UL-K4 ①	13650-127				•			•			•		
28	25-16-K4 ①	8650-332				•				•				
29	25-16-UL-K4 ①	8650-330				•				•		•		

NOTE: Bracket Assembly not furnished with Rotary Spool Option [W], Items 9, 17 and 21.

① When using (K4) Float Sections in Model 25P Control Valve assemblies, it must be placed next to the inlet cover. Only ONE float section may be used in the valve assembly.

Upper Work Port Relief Options for 25P and V42 Control Valves Relief Model 'YC'

Order Code	Bill of Material #	Pressure Range and Setting		
		500-1000 Set @ 1000 PSI c/p	1001-1500 Set @ 1500 PSI c/p	1501-3000 Set @ 3000 PSI c/p
YC-1000	8650-399	•		
YC-1500	8650-400		•	
YC-3000	8650-401			•



YC Relief Valve Cartridge

Relief Models 'WH' and 'RP51'

Order Code	Bill of Material #	Pressure, PSI					
		500-1249 Set @ 1200 PSI c/p	1250-1749 Set @ 1700 PSI c/p	1750-1999 Set @ 1950 PSI c/p	2000-2599 Set @ 2550 PSI c/p	2501-3000 Set @ 3000 PSI c/p	500-3500 Set @ 3000 PSI c/p
WH-1200	8650-417	•					
WH-1700	8650-418		•				
WH-1950	8650-419			•			
WH-2550	8650-420				•		
WH-3000	8650-398					•	
RP51A-3000	8650-421						•
K-20-NR	8650-382	Relief Cavity Plug Kit (NR Option)					



WH Relief Valve Cartridge

NOTE: All the above Relief Valves have stainless steel springs.

Model 'WH' Relief Valves are internal shim adjustable. Model 'RP51' Relief Valves are external screw adjustable.

Crack Pressure (c/p) set at 1 GPM.

Work Port Option Kits

Includes all necessary Seals.

Order Code	Bill of Material #	Description
K-WH-A	8650-381	Screw adjustable option for WH Relief
K-42-UAC	8650-378	Upper Anti-Cavitation Check
K-42-LAC	8650-377	Lower Anti-Cavitation Check



Upper Anti-Cavitation Check



Lower Anti-Cavitation Check

MID INLET SECTIONS FOR 25P AND V40 CONTROL VALVES (Housing No. 3953)

Order Code	Bill of Material #	Combined Flow w/Top Inlet [CF]	1" Port [100]	SAE 16 Port [16]
25-100-CF	8650-055	•	•	
40-16-CF	8650-056	•		•

NOTE: Machined to accept the same relief options as the Left Inlet Cover.



3953 Mid-Inlet Section

Mid Inlet Option Kits

Order Code	Bill of Material #	Description
K-40-SF	8650-080	Mid-Inlet Conversion Kit to Split Flow
K-40-CF	13650-929	Mid-Inlet Conversion Kit to Combined Flow

Spool Action Assembly
(Bonnet)

Spool Positioner Option Kits

Order Code	Bill of Material #	Description
K-25-A	8650-383	Spring Extended Spool Positioner Kit
K-25-D	8650-386	3-Position Detent Kit
K-25-R	8650-385	Spool "IN" Detent w/Spring Return to Neutral Positioner Kit
K-25-W	8650-384	Rotary Spool Positioner Kit
K-25-L	8650-159	Spool Travel Limiter
K-PA100-25	13030-001	Pneumatic Spool Positioner Kit

NOTE: The above kits will not work with Float or Regenerative Spools.



Vertical Handle



Horizontal Handle

Handle End Options

Handle Kits contain necessary links and pins.

Order Code	Bill of Material #	Description
K-25-VH-B	8650-150	Vertical Handle Assembly (Black)
K-25-VH-P	8650-148	Vertical Handle Assembly (Plain)
K-25-HH-B	8650-147	Horizontal Handle Assembly (Black)
K-25-HH-P	8650-145	Horizontal Handle Assembly (Plain)
K-25-BOOT*	8650-157	Spool Boot Assembly (See Note)
K-25-MA	8650-158	Male Spool Clevis

NOTE: * Special Order Only – Standard Distributor Stock sections do not have boot grooves in spools.

Section Stud Assembly Kits

Includes section seals, studs and nuts.



Section Stud Assembly Kit

Valve with 8089 Left Cover & 1644 Right	Bill of Material #	Valve with 8089 Left cover & 8090 Right Cover	Bill of Material #	Valve with 3000 or 3001 Left Integral Sect. & 1624 Right Integral Sect or 1644 Right Cover	Bill of Material #	Valve with 3000 or 3001 Left Integral Sect & 8090 Right Cover	Bill of Material #	Number of Valve spools & Mid-Inlet Sections
K-40-LRE-1	8650-280	K-40-LRT-1	8650-288	K-25-SLE-1	8650-272	K-25-SLT-1	8650-264	1
K-40-LRE-2	8650-281	K-40-LRT-2	8650-289	K-25-SLE-2	8650-273	K-25-SLT-2	8650-265	2
K-40-LRE-3	8650-282	K-40-LRT-3	8650-290	K-25-SLE-3	8650-274	K-25-SLT-3	8650-266	3
K-40-LRE-4	8650-283	K-40-LRT-4	8650-291	K-25-SLE-4	8650-275	K-25-SLT-4	8650-267	4
K-40-LRE-5	8650-284	K-40-LRT-5	8650-292	K-25-SLE-5	8650-276	K-25-SLT-5	8650-268	5
K-40-LRE-6	8650-285	K-40-LRT-6	8650-293	K-25-SLE-6	8650-277	K-25-SLT-6	8650-269	6
K-40-LRE-7	8650-286	K-40-LRT-7	8650-294	K-25-SLE-7	8650-278	K-25-SLT-7	8650-270	7
K-40-LRE-8	8650-287	K-40-LRT-8	8650-295	K-25-SLE-8	8650-279	K-25-SLT-8	8650-271	8



V42

Directional Control Valves

Gresen's Model V42 Directional Control Valve is designed for parallel hydraulic circuit applications, up to 3500 PSI (242 bar) continuous operating pressure. Pressure is limited to 2000 PSI (136 bar) if NPT pipe ports are required. For pressures beyond 2000 PSI, SAE straight thread O-ring ports or BSP ports are required.

Service or conversion is simple since individual sections can be added, removed or replaced in the field. Individual service or field conversion sections, rather than complete valve assemblies, can be stocked thus reducing inventories.

The Model V42 is a parallel circuit valve. Two or more spools may be actuated at the same time and the oil will follow the path of least resistance. If a 2-spool valve is used to control two hydraulic cylinders, each with a different load, the cylinder with the lightest load will operate first if both spools are fully actuated at the same time. If the spool controlling the cylinder with the light load is metered (not fully actuated), then both cylinders may be operated at the same time. When a spool is fully actuated, the open center core is blocked and oil is directed into the power core. Oil is then available to the work ports of all sections in the valve assembly.

- 40 GPM nominal flow rating
- Pressures to 3500 PSI
- Manual or solenoid actuator options
- Manual, solenoid, hydraulic remote or pneumatic actuator options.
- Mid inlet for combination and split flow applications

Specifications

Pressure Rating:

Continuous Operating. *3500 PSI (242 bar)

*Limited to 2000 PSI (136 bar) when NPT pipe ports are used

Capacity: Flow rate is determined by the maximum pressure drop acceptable for the application

Operating Temperature: -40°F (-40°C) to 176°F (80°C)

Filtration Required (Min.) 33 micrometre

Weight:

Inlet Cover Approx. 12 lbs. (5,4 kg)

Outlet Cover Approx. 6 lbs. (2,7 kg)

Work Section, Each Approx. 15 lbs. (6,8 kg)



8089 Left Cover

8288 Left Cover
Trepan grooves not
machined. Use with V42
Valves**V42 LEFT COVERS (Housing No.'s 8089 & 8288)**

Order Code	Bill of Material #	Top Inlet & Outlet	End Inlet & Outlet	SAE 20 [20]	With Pressure Reducing Valve for Solenoid Option
42-LC-20	8650-032	•	•	•	
42-LC-20-P	8650-033	•	•	•	•

NOTE: Two Port Plugs are furnished with each cover.
One Plug is machined for 1/4" NPT gauge port.
Gauge port will be plugged.
All inlet Covers machined to accept Relief Cartridges.

RP60A
Relief Valve Cartridge**Main Relief Options for 25P, V40 and V42 Inlet Covers**

Includes all necessary Seals.

Order Code	Bill of Material #	Pressure Range, PSI 500-5000 Set @ 2500 PSI c/p
RP60A-2500	8650-393	•
K-40-NR	8650-379	Relief Plug Kit (NR Option)

NOTE: Above Relief Valve has stainless steel spring and is external screw adjustable.
Crack Pressure (c/p) set at 1 GPM.

*8091 Right Cover
Trepan grooves machined
for use with V42 Valves8090 Right Cover
Trepan grooves machined
for use with V42 Valves8287 Right cover
Trepan grooves machined
for use with V42 Valves**V42 RIGHT COVERS (Housing No.'s 8090, 8091 & 8287)**

Order Code	Bill of Material #	End Outlet [E]	Top Outlet [T]	SAE 16 Port [16]	SAE 20 Port [20]	End Power Beyond [EY]	Machined for Conversion Top Power Beyond or Closed Center [MY]	With 12 VDC Pressure Build-Up Valve for Solenoid [P]	With Mechanical Pressure Build-Up Valve for Solenoid [PM]	With 24 VDC Pressure Build-Up Valve for Solenoid [P]
42-RC-20-E	8650-034	•			•					
42-RC-20-EY	8650-036				•	•				
42-RC-16-MY	8650-582			•			•			
42-RC-16-TP-24	13650-282		•	•						•
42-RC-16-TP-12	8650-583		•	•				•		
42-RC-16-TPM	8650-964		•	•					•	

NOTE: 3/4" NPT plug furnished with 8090 covers for conversion to power beyond.

***8091 Right Cover Identification**

Covers with 1 hole through Inner Surface are used for Power Beyond or Closed Center
Covers with 2 holes through Inner Surface (pictured above) are used for Turn Around or Outlet

V42 PARALLEL WORK SECTIONS (Housing No. 8045)

Includes Handle Bracket.

Item No.	Order Code	Bill of Material #	4-Way 3-Pos. [4]	3-Way 3-Pos. [3]	4-Way 3-Pos. Free Flow [4]	4-Way 4-Pos. Float Assembly [K4]	3 Pos. Detent [D]	Rotary Spool Actuator [W]	SAE 12 Work Ports [12]	SAE 16 Work Ports [16]	Upper Options Machined & Plugged [U]	Upper & Lower Options Machined & Plugged [UL]	Internal Hydraulic Detent Release Set @ 2000 PSI [K0]	Hydraulic Remote Actuator [HRO] [HRH]	12 VDC Solenoid [SOL]	Stainless Steel Spool [SS]	24 VDC Solenoid [SOL]
1	42-12-03	13650-138		•					•								
2	42-12-U-03	13650-142		•					•		•						
3	42-16-U-03	8650-038		•						•	•						
4	42-12-04	13650-137	•						•								
5	42-12-U-04	13650-140	•						•		•						
6	42-12-UL-04	13650-141	•						•			•					
7	42-12-F4	13650-139			•				•								
8	42-12-K4	13650-143				•			•								
9	42-16-F4	8650-040			•					•							
10	42-16-UL-04	8650-041	•							•		•					
11	42-16-DF4	8650-050			•		•			•							
12	42-16-U-K04-2000	8650-616	•							•	•		•				
13	42-16-04-HRO	8650-581	•							•				•			
14	42-16-04-HRH	8650-580	•							•				•			
15	42-16-04-SOL-12	8650-044	•							•					•		
16	42-16-UL-DF4	8650-047			•		•			•		•					
17	42-16-04	8650-481	•							•							
18	42-16-U-04	8650-617	•							•	•						
19	42-16-UL-W4-SS	8650-511	•					•		•		•				•	
20	42-16-WF4-SS	8650-510			•			•		•						•	
21	42-16-W4	8650-642	•					•		•							
22	42-16-04-SOL-24	13650-281	•							•							•
23	42-16-U-F4	13650-284			•					•	•						
24	42-16-UL-F4	13650-285			•					•		•					

NOTE: Bracket Assembly not furnished with Rotary Spool Option [W], items 19, 20 and 21 and Hydraulic Remote Option [HRO] [HRH] Items 13 and 14.



8045
3-Way Work Section



8045
4-Way Work Section



8045
External Solenoid
Controlled Work Section

V42 SPECIAL WORK SECTIONS, (Housing No.'s 8046, 8138 & 8675)

Includes Handle Bracket.

8138 Regenerative
Work Section
or
8046 Float Section

Order Code	Bill of Material #	4-Way 3-Position [4]	4-Way 4-Position [K4]	4-Way 4-Position Regenerative [RG4]	SAE 16 Work Ports [16]	Tandem Circuit [T]	Upper Options Machined & Plugged [U]	Upper & Lower Options Machined & Plugged [UL]
42-16-UL-K4	8650-045		•		•			•
42-16-RG4	8650-046			•	•			
42T-16-U-04	8650-039	•			•	•	•	

V42 MID-INLET SECTIONS (Housing No. 3953)

3953 Mid Inlet Section

Order Code	Bill of Material #	Combined Flow with Top Inlet	SAE 16 Port [16]	Split Flow with Top Inlet
42-16-CF	8650-048	•	•	
42-16-SF	8650-049		•	•

NOTE: Machined to accept the same relief options as the Left Inlet Cover.

Mid Inlet Option Kits

Order Code	Bill of Material #	Description
K-40-SF	8650-080	Mid Inlet Conversion Kit to Split Flow
K-40-CF	13650-929	Mid Inlet Conversion Kit to Combined Flow

**Upper Work Port Relief Options for 25P and V42 Control Valves
Relief Model 'YC'**

YC Relief Valve Cartridge

Order Code	Bill of Material #	Pressure Range and Setting		
		500-1000 Set @ 1000 PSI $\frac{1}{p}$	1001-1500 Set @ 1500 PSI $\frac{1}{p}$	1501-3000 Set @ 3000 PSI $\frac{1}{p}$
YC-1000	8650-399	•		
YC-1500	8650-400		•	
YC-3000	8650-401			•

Relief Models 'WH' and 'RP51'

Order Code	Bill of Material #	Pressure Range and Setting					
		500-1249 Set @ 1200 PSI c/p	1250-1749 Set @ 1700 PSI c/p	1750-1999 Set @ 1950 PSI c/p	2000-2599 Set @ 2550 PSI c/p	2501-3000 Set @ 3000 PSI c/p	500-3500 Set @ 3000 PSI c/p
WH-1200	8650-417	•					
WH-1700	8650-418		•				
WH-1950	8650-419			•			
WH-2550	8650-420				•		
WH-3000	8650-398					•	
RP51A-3000	8650-421						•
K-20-NR	8650-382		Relief Cavity Plug Kit (NR Option)				

NOTE: All the above Relief Valves have stainless steel springs.

Model 'WH' Relief Valves are internal shim adjustable. Model 'RP51' Relief Valves are external screw adjustable.

Crack Pressure (c/p) set at 1 GPM.



WH Relief Valve Cartridge

Work Port Option Kits

Includes all necessary Seals.

Order Code	Bill of Material #	Description
K-WH-A	8650-381	Screw Adjustable Option for WH Relief
K-42-UAC	8650-378	Upper Anti-Cavitation Check Assembly
K-42-LAC	8650-377	Lower Anti-Cavitation Check Assembly



Upper Anti-Cavitation Check



Lower Anti-Cavitation Check

Spool Positioner Option Kits

Order Code	Bill of Material #	Description
K-42-A	8650-162	Spring Extended Spool Positioner Kit
K-42-D	8650-163	3-Position Detent Kit
K-42-R	8650-164	Spool "IN" Detent w/Spring Return to Neutral Positioner Kit
K-42-W	8650-165	Rotary Spool Positioner Kit
K-42-SOL-12	8650-166	12VDC Solenoid Actuator
K-42-SOL-24	13650-283	24VDC Solenoid Actuator
*K-42-HR	8650-576	Hydraulic Remote Spool Positioner Kit
*K-42-HRO	8650-577	Hydraulic Remote Spool Positioner Kit w/Override
K-PA100-42	13028-001	Pneumatic Spool Positioner Kit

NOTE: The above kits will not work with Float, Hydraulic Detent Release (KO), or Regenerative spools.

*Contains both Bonnets required.



Spool Action Assembly (Bonnets)

Handle End Option

Handle Kit contains necessary Links and Pins.



Vertical Handle



Horizontal Handle

Order Code	Bill of Material #	Description
K-42-VH-B	8650-174	Vertical Handle Assembly (Black)
K-42-VH-P	8650-172	Vertical Handle Assembly (Plain)
K-42-HH-B	8650-171	Horizontal Handle Assembly (Black)
K-42-HH-P	8650-169	Horizontal Handle Assembly (Plain)
K-42-RET	8650-175	Standard Seal Retainer Plate
K-42-BOOT	8650-176	Spool Boot Assembly
K-42-MA	8650-177	Male Spool Clevis

Section Stud Assembly Kits

Includes Section Seals, Studs and Nuts.



Section Stud Assembly Kit

Valve with 8089 Left Cover and 8091 Right End Out	Bill of Material #	Valve with 8089 Left Cover and 8090 or 8287 Right Top Out	Bill of Material #	Number of Valve Spools & Mid-Inlet Sections
K-40-LRE-1	8650-280	K-40-LRT-1	8650-288	One Section
K-40-LRE-2	8650-281	K-40-LRT-2	8650-289	Two Section
K-40-LRE-3	8650-282	K-40-LRT-3	8650-290	Three Section
K-40-LRE-4	8650-283	K-40-LRT-4	8650-291	Four Section
K-40-LRE-5	8650-284	K-40-LRT-5	8650-292	Five Section
K-40-LRE-6	8650-285	K-40-LRT-6	8650-293	Six Section
K-40-LRE-7	8650-286	K-40-LRT-7	8650-294	Seven Section
K-40-LRE-8	8650-287	K-40-LRT-8	8650-295	Eight Section

Solenoid Tubing Kit

Order Code	Bill of Material #	Description
K-42-TUBE	8650-486	Tubing assembly between Utility Section and Solenoid Spool Actuator



V50

Directional Control Valves

- 50 GPM nominal flow rating
- Pressures to 3500 PSI
- Series, Parallel and Tandem circuit options
- Manual, hydraulic remote or pneumatic actuator options

Gresen's Model V50 Directional Control Valve is available for parallel, tandem and combined parallel/tandem hydraulic circuit applications, up to 3500 PSI (242 bar) continuous operating pressure. Its new spool design has resulted in lighter spool actuating effort making its finger-tip touch and extra fine metering characteristics ideal for back hoe, front end loader, personnel lift, as well as heavy duty crane applications. This sensitivity also gives the design engineer a wider latitude of mechanical linkage possibilities.

Service or conversion is simple since individual sections can be added, removed or replaced in the field. Individual service or field conversion sections, rather than complete valve assemblies, can be stocked thus reducing inventories.

Specifications

Pressure Rating:

Continuous Operating, Max. 3500 PSI (242 bar)

Capacity:

Nominal Flow 50 GPM (189 litres/min)

Maximum flow rate is determined by the maximum pressure drop acceptable for the application

Operating Temperature: -40°F (-40°C) to 176°F (80°C)

Filtration Required (Min.) 33 micrometre

Weight:

Inlet Cover Approx. 18 lbs. (8,2 kg)

Outlet Cover Approx. 11 lbs. (5,0 kg)

Work Section, Each Approx. 17 lbs. (7,7 kg)

V50 LEFT COVERS (Housing No. 8916)

8916 Left Cover

Order Code	Bill of Material #	End Inlet [E]	Top Inlet [T]	End Outlet [E]	Top Outlet [T]	1/4" NPT Gauge Port Plugged	SAE 20 Port Size [20]
50-LC-20-E	8650-535	•		•		•	•
50-LC-20-T	8650-536		•		•	•	•

NOTE: All Left Covers are machined to accept Main Relief Valve, Model RP50A.

Main Relief Options

Includes all necessary Seals.

Model RP50A
Relief Valve Cartridge

Order Code	Bill of Material #	Description
K-50-NR	8650-561	No Relief Plug Kit (NR Option)
RP50A-2500	8650-560	Pilot-operated Relief Cartridge

NOTE: Above Relief Valve has stainless steel spring and is external screw adjustable from 500 to 3500 PSI.

Relief Valve Cartridge set at 2500 PSI crack (c/p) at 1 GPM.

V50 RIGHT COVERS (Housing No. 22691)

22691 Right Cover

Order Code	Bill of Material #	End Outlet [E]	Top Outlet [T]	SAE 20 Port Size [20]	Machined for Power Beyond [Y]
50-RC-20-ETY	13650-650	•	•	•	•

NOTE: Top Port plugged. End port may be converted to Closed Center or Power Beyond using Option Kits below.

Right Cover Option Kits

Order Code	Bill of Material #	Description
K-SAE-20	8650-302	Conversion Plug
K-50-C	8650-563	Closed Center Plug
K-50-16Y	8650-564	SAE 16 Power Beyond Sleeve

V50 WORK SECTIONS (Housing No.'s 8917 & 8918)

3-Way or 4-Way Sections include Handle Brackets* and drilled and plugged work port options.

Item No.	Order Code	Bill of Material #	4-Way 3-Pos. [4]	3-Way 3-Pos. [3]	Free Flow Motor Spool [F]	4-Way 4-Position Float [K4]	SAE 16 Work Ports [16]	3-Position Detent [D]	Hydraulic Remote Spool Actuator [HR]	Tandem Circuit [T]	Series Circuit [S]
1	50-16-03	8650-538		•			•				
2	50-16-F3	8650-539		•	•		•				
3	50-16-04	8650-540	•				•				
4	50-16-F4	8650-541	•		•		•				
5	50-16-DF4	8650-542	•		•		•	•			
6	50-16-K4	8650-543				•	•				
7	50-16-04-HR	8650-544	•				•		•		
8	50-16-F4-HR	8650-545	•		•		•		•		
9	50T-16-03	8650-546		•			•			•	
10	50T-16-04	8650-547	•				•			•	
11	50T-16-K4	8650-548				•	•			•	
12	50T-16-04-HR	8650-549	•				•		•	•	
13	50S-16-04	13650-144	•				•				•

*Items 7,8 and 12 do not include handle brackets.



8917 3-Way, 4-Way or 4-Way Float Parallel Section



8918 3-Way, 4-Way or 4-Way Float Tandem Section



Section with Hydraulic Remote Spool Actuator (HR)

V50 MID-INLET SECTIONS (Housing No.'s 12138, 8918 & 8917)

Order Code	Bill of Material #	Split [SF]	Combined [CF]	SAE 16 Inlet [16]	Description
20/50-16-SF	8650-798	•		•	V20/V50 Split Flow Transition Mid Inlet
20/50-16-CF	8650-797		•	•	V20/V50 Combined Flow Transition Mid Inlet
50-16-SF	13650-941	•		•	V50 Split Flow Mid Inlet
50-16-CF	13650-942		•	•	V50 Combined Flow Mid Inlet

NOTE: All sections machined to accept main relief cartridges. For cartridges, refer to page 48.

V20/V50 mid-inlet sections combine V20 work sections (upstream) with V50 work sections (downstream)

Standard V50 section stud kits are used for downstream V50 work sections Special V20 section stud kits listed on page A-9 are used for upstream V20 work sections

Handle End Options

Handle Kits contain necessary Links and Pins.

Order Code	Bill of Material #	Description
K-50-VH	8650-567	Vertical Handle
K-50-HH	8650-566	Horizontal Handle
K-50-BOOT	8650-565	Spool Boot Assembly



Vertical Handle



Horizontal Handle

Section Stud Assembly Kits

Includes Section Seals and Nuts.

Order Code	Bill of Material #	Number of Work Sections
K-50-1L	13650-644	One Section
K-50-2L	13650-645	Two Section
K-50-3L	13650-646	Three Section
K-50-4L	13650-647	Four Section
K-50-5L	13650-648	Five Section
K-50-6L	13650-649	Six Section

*L is code for new style longer tie bolts part #22708-XXX.

Spool Positioner Option KitsSpool Action Assembly
(Bonnet)

Order Code	Bill of Material #	Description
K-50-D	8650-562	3-Position Detent
K-PA100-50	13044-001	Pneumatic Spool Positioner Kit
*K-50-HR	13650-949	Hydraulic Remote Spool Positioner Kit
*K-50-HRO	13650-950	Hydraulic Remote with Override Spool Positioner Kit

NOTE: Cannot be used on Float Spool.

*Contains both bonnets needed.

Work Port Option Kits

Includes all necessary Seals.

Model RP50A
Relief Valve Cartridge

Order Code	Bill of Material #	Pressure Range, PSI 500-3500 Set @ 2500 PSI c/p	Description
RP50A-2500	8650-560	•	Pilot-Operated Relief Cartridge
RP50A-AC-2500	8650-966	•	Combination Relief & Anti-Cav.
K-50-AC	8650-558		Anti-Cavitation Check
K-50-NR	8650-561		No Relief Plug Kit (NR Option)

NOTE: All above Relief Valves have stainless steel springs and are external screw adjustable. Crack Pressure (c/p) set at 1 GPM.

Specifications

Capacity: Up to 20 GPM (75,7 litres/min)
Maximum Pressure: 2000 PSI (138,0 bar)
Maximum Exhaust Core Pressure: 500 PSI (34,5 bar)
Operating Temperature:-40°F (-40°C) to 176°F (80°C)
Filtration Required (Min.) 33 micrometre

Monoblock Directional Control Valves

SP



The Gresen Model SP Directional Control Valve is manufactured to give outstanding, long-lasting performance. Spools are hone-fitted for above average "load-hold" characteristics.

Model SP Valves are available either 3-way (single-acting), 4-way (double-acting) or with combinations of both.

Monoblock valve housings are available in 1-, 2-, and 3-spool configurations. Optional spools, bonnet assemblies and ports are available on special order.

Features

- Adjustable or Non-Adjustable Ball/Spring Type Relief Valve.
- Optional Model WS Differential Poppet Main Relief Valve available.
- Built-In Load Checks - One Check for "A" Port Circuit and one for "B" Port Circuit.
- Control Handles may be mounted in "UP" or "DOWN" position. (Handles included as standard equipment, except with "A" or "W" options).
- Power Beyond Outlet Available.

Shipping Weights

1-Spool	15½ lbs (7,03 kg)
2-Spool	24 lbs (10,89 kg)
3-Spool	32½ lbs (14,74 kg)

SPK



The Model SPK Directional Control Valve is available in 1-, 2-, or 3-spool configurations. The No. 1 spool is always a 4-way float spool. Spools No. 2 and No. 3 are either 3-way or 4-way, the same as in the SP valve.

The float spool is the same as the 4-way, 3-position spool, with the addition of a fourth "Float" position. When in "Float" position, the pump flow is directed to the tank through the open center core. Both work ports are open to the tank.

Applications for valves with "Float" positions are bulldozers, snow plows and other types of equipment that require a combination of both "Float" and "Hold" when in neutral.

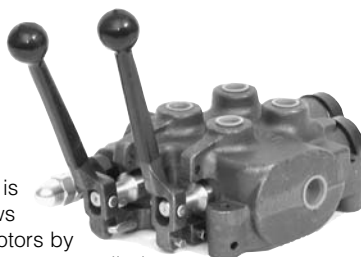
Features

- Detent in Float Position (Spool No. 1 only).
- Adjustable or Non-Adjustable Ball/Spring Type Relief Valve.
- Model WK Differential Poppet Relief available.
- Built-In Load Checks - One Check for "A" Port Circuit and one for "B" Port Circuit.
- Control Handles may be mounted in "UP" or "DOWN" position.
- Power Beyond Outlet Available.

Shipping Weights

1-Spool	17½ lbs (7,94 kg)
2-Spool	23½ lbs (10,66 kg)
3-Spool	29½ lbs (13,38 kg)

SSK



The Model SSK 2-Spool Directional Control Valve is designed for Series Circuit Operation, which allows the simultaneous operation of two cylinders or motors by directing the discharge oil from the cylinder or motor controlled by the No. 1 spool to the cylinder or motor controlled by the No. 2 spool.

The No. 1 spool is a 4-way, 4-position float spool. This spool is spring-centered to neutral in 3 positions with a detent provided for the "Float" position. The No. 2 spool is a 4-way, 3-position spool with spring return to neutral from both work ports.

For use in any Open Center circuit where it is necessary to actuate two different functions simultaneously.

Features

- Available in 2-spool model only.
- Detent in Float Position (Spool No. 1 only).
- Adjustable or Non-Adjustable Ball/Spring Type Relief Valve.
- Model WK Differential Poppet Relief available.
- Built-In Load Checks - One Check for each spool.
- Control Handles may be mounted in "UP" or "DOWN" position.
- Power Beyond Outlet Available.

Shipping Weights

2-Spool	24 lbs (10,89 kg)
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MODELS SP, SPK AND SSK MONOBLOCK DIRECTIONAL CONTROL VALVES

Item No.	Order Code	Bill of Material #	4-Way 3-Pos. [4]	3-Way 3-Pos. [3]	Spring Return to Neutral	3-Position Detent [D]	Rotary Spool Actuator [W]	4-Way 3-Pos. Free Flow [F]	Top Outlet [T]	Machined and Plugged Conversion to Power Beyond or Closed Center [X]	End Outlet [E]	Stainless Steel Spools [SS]	Optional SAE Porting [G]
SP 1-Spool (See Note 1)													
1	SP-4-HP	8650-674	•		•						•		
2	SPXTE-4-HP-SS	8650-936	•		•				•	•	•	•	
3	SP-D4-HP	8650-673	•			•					•		
4	SP-W4-HP	8650-671	•				•				•		
5	SPXTE-W4-HP-SS	8650-937	•				•		•	•	•	•	
6	SPXTE-F4-HP	8650-938			•			•	•	•	•		
7	SPXTE-4-HP	8650-670	•		•				•	•	•		
8	SP-3-HP	8650-668		•	•						•		
9	SPXTE-3-HP	8650-665		•	•				•	•	•		
10	GSP-4-HP	8650-667	•		•						•		•
11	GSPXTE-4-HP	8650-666	•		•				•	•	•		•
SP 2-Spool (See Note 1)													
12	SP-4-4-HP	8650-664	•		•						•		
13	SPXTE-4-4-HP	8650-663	•		•				•	•	•		
14	SPXTE-4-4-HP-SS	8650-662	•		•				•	•	•	•	
15	GSPXTE-4-4-HP	8650-661	•		•				•	•	•		•
16	SPXTE-4-3-HP	8650-660	#1-Spool	#2-Spool	•				•	•	•		
17	SPXTE-3-4-HP	8650-659	#2-Spool	#1 Spool	•				•	•	•		
SP 3-Spool (See Note 1)													
18	SPXTE-3-4-4-HP	8650-658	#2 Spool #3 Spool	#1 Spool	•				•	•	•		
19	SP-4-4-4-HP	8650-657	•		•						•		
20	SPXTE-4-4-4-HP-SS	8650-939	•		•				•	•	•	•	
21	SPXTE-4-4-4-HP	8650-655	•		•				•	•	•		
22	GSPXTE-4-4-4-HP	8650-653	•		•				•	•	•		•
SPK 1-Spool (See Notes 1 and 2)													
23	SPK-4-HP	8650-652	•		•						•		
24	SPKXTE-4-HP	8650-651	•		•				•	•	•		
25	GSPKXTE-4-HP	8650-650	•						•	•	•		•
SPK 2-Spool (See Notes 1 and 2)													
26	SPK-4-4-HP	8650-649	•		•						•		
27	SPKXTE-4-4-HP	8650-648	•		•				•	•	•		
28	GSPKXTE-4-4-HP	8650-647	•		•				•	•	•		•
SPK 3-Spool (See Notes 1 and 2)													
29	SPK-4-4-4-HP	8650-646	•		•						•		
30	SPKXTE-4-4-4-HP	8650-645	•		•				•	•	•		
31	GSPKXTE-4-4-4-HP	8650-644	•		•				•	•	•		•
SSK (See Notes 1, 2 and 3)													
32	SSKXT-4-4-HP	8650-643	•		•				•	•			

Note 1. All SP, SPK and SSK Valves are shipped with complete Handle Assembly with the exception of Items 4 and 5.

Note 2. Spool #1 of SPK and SSK Valves is a 4-Way, 4-Position Float (K4) only.

Note 3. SSK can be converted to power beyond but cannot be converted to closed center operation.

Note 4. When casting is machined with both top and end outlet, top outlet will be plugged.

Note 5. All SP, SPK and SSK Valves include high pressure main relief valves (900-2000 PSI) set @ 1500 PSI.

Porting Options

Porting (Standard)	Optional SAE Porting (G)
Inlet - 3/4" NPT	Inlet - SAE 12
Work Ports - 1/2" NPT	Work Ports - SAE 10
Outlets - 3/4" NPT	Outlet - Standard, SAE 12 End With Optional Conversion Machining (X) SAE 10 (Top or End)

OPTION KITS

Right End Modification Kits

Includes all necessary Seals.

Order Code	Bill of Material #	Description
K-SP-75-Y	8650-130	3/4" NPT Power Beyond Sleeve Kit
K-SP-10-Y	8650-131	SAE #10 Power Beyond Sleeve Kit
K-SP-12-Y	8650-132	SAE #12 Power Beyond Sleeve Kit
K-SP-C	8650-133	Closed Center Plug Kit
K-SP-X	8650-134	Conversion Plug Kit



Power Beyond Sleeve

Spool Action Option Kits

Order Code	Bill of Material #	Description
K-SP-D	8650-135	3-Position Detent Kit
K-SP-DS	8650-136	Detent Stop for Neutral & Spool Out or Spool In
K-SP-A	8650-137	Spring Extended Spool
K-SP-L	8650-138	Spool "IN" Travel Limiter, Adjustable

Handle End Option Kits

Order Code	Bill of Material #	Description
*K-SP-HB	8650-117	Standard Handle (Black)
*K-SP-HP	8650-072	Standard Handle (Plain)
K-SP-LINK	13650-946	Link and Pin Kit for SP Handles

*Does not include Links or Pins.



SP Handle

Relief Kit

Order Code	Bill of Material #	Description
K-SP-NR	8650-211	No Relief Conversion Kit

Directional Control Valves

300

The Model 300 Valve was designed to control a single-acting cylinder or a uni-directional hydraulic motor. The spool in this valve is a 3-way, 3-position spool - the 3 positions are Power, Neutral, and Exhaust. "B" Port is always the power port and "A" port is always plugged.

The Standard Model 300 Valve is spring-centered to neutral position with work port blocked in neutral. Optional spool and spool positioner assemblies are available.

This valve, available in single-spool housing only, is ideal for general mobile and industrial hydraulic applications.



Features

- Built-In Relief Valve, Shim adjustable (optional).
- Replaceable, Hardened Relief Valve Seats.
- Built-In Load Check.

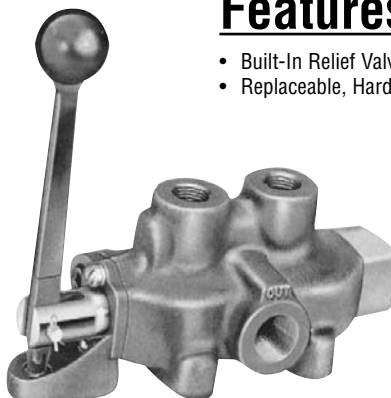
400

The Model 400 Valve was designed to control a double-acting cylinder or a reversible hydraulic motor. The standard spool in this valve is a 4-way, 3-position spool. The Model 400 Valve cannot be converted to a 3-way valve..

The Model 400 Valve does not have a load check assembly to prevent reverse flow.

The spool is spring-centered to Neutral position with cylinder ports blocked in neutral. Optional spool and spool positioner assemblies are available.

This valve, available in single-spool housing only, is ideal for general mobile and industrial hydraulic applications.



Features

- Built-In Relief Valve, Shim adjustable (optional).
- Replaceable, Hardened Relief Valve Seats.

Specifications (Both Series)

With Standard Non-Adjustable Relief Valve

Capacity, nominal: 16 GPM (60,56 litres/min)

Maximum Pressure: 400 to 2500 PSI (27,6 to 172,5 bar)

With No Relief Valve (Relief Cavity not Machined)

Capacity, nominal: 16 GPM (60,56 litres/min)

Maximum Pressure: 2500 PSI (172,5 bar)

Maximum Exhaust Core Pressure:*1000 PSI (34,5 bar)

* Valves with exhaust core pressures above 500 PSI may require a heavy spool centering spring.

Operating Temperature:-40°F (-40°C) to 176°F (80°C)

Filtration Required (Min.) 33 micrometre

Port Sizes:

Inlet and Outlet Ports ³/₄ NPT

Work Ports ¹/₂ NPT

Shipping Weight: 8¹/₄ lbs. (3,74 kg)

MODELS 300 AND 400

All model 300 and 400 valves are shipped with complete Handle Assembly.

Order Code	Bill of Material #	3-Way	4-Way	SAE Ports	NPT Ports	Spring Centered	3-Pos. Detent	Closed Center Spool	Free Flow Spool	Relief Valve
300	8650-682	•			•	•				•
310	8650-683	•			•		•			•
400	8650-681		•		•	•				•
410	8650-680		•		•		•			•
410-40	8650-679		•		•		•		•	•
430	8650-678		•		•	•		•		•
440	8650-677		•		•	•			•	•
G400	7239-146		•	•		•				•
G-400-NR	7239-171		•	•		•				

NOTE: All valves include relief set @ 1500 PSI @ 7.6 GPM - shim adjustable.
Standard porting includes 1/2" NPT work ports, 3/4" NPT inlet and outlet ports.
SAE porting is SAE 12 Inlet and SAE 10 ports.
Optional porting includes SAE #10 work ports and SAE #12 Inlet and Outlet ports.



300 Valve



400 Valve



Spool Action Assembly (Bonnet)

Spool Action Option Kits

Order Code	Bill of Material #	Description
K-400-D	8650-141	Three Position Detent for Models 300 and 400
K-400-A	8650-143	Spring Extended Spool for Models 300 and 400

Port Plugs

PORT PLUGS

For use with all directional control valves.

Order Code	Bill of Material #	Description
K-NPT-13	8650-306	1/8" NPTF Pipe Plug
K-NPT-25	8650-307	1/4" NPTF Pipe Plug
K-NPT-38	8650-308	3/8" NPTF Pipe Plug
K-NPT-50	8650-309	1/2" NPTF Pipe Plug
K-NPT-75	8650-310	3/4" NPTF Pipe Plug
K-NPT-100	8650-305	1" NPTF Pipe Plug
K-NPT-125	8650-304	1 1/4" NPTF Pipe Plug
K-SAE-6	8650-296	Includes 2825-100 SAE 6 Plug and 2705-001 Seal
K-SAE-8	8650-297	Includes 2684-001 SAE 8 Plug and 2706-001 Seal
K-SAE-10	8650-298	Includes 1458-001 SAE 10 Plug and 2707-001 Seal
K-SAE-12	8650-299	Includes 1726-001 SAE 12 Plug and 2708-001 Seal
K-20-X	8650-100	Includes 1727-001 SAE 14 Plug and 2709-001 Seal
K-SAE-16	8650-301	Includes 1629-001 SAE 16 Plug and 2710-001 Seal
K-SAE-20	8650-302	Includes 6280-001 SAE 20 Plug and 6281-001 Seal
K-SAE-24	8650-303	Includes 8095-001 SAE 24 Plug and 3640-001 Seal



NPT Plug



SAE Plug

GRESEN® Directional Control Valves

SOLENOID OPERATED DIRECTIONAL CONTROL VALVES

Specifications

Pressure Rating:	.3000 PSI (207 bar)
Flow Rating:	.8 GPM (30 litres/min) for 1/4" valve
	12 GPM (45 litres/min) for 3/8" valve
Max. Operating Temperature:	.200°F (93°C)
Series Valve Weight (approx.):	10.8 lbs. (4,9 kg) for 1/4" valve
	13.0 lbs. (5,9 kg) for 3/8" valve
Parallel Valve Weight (approx.):	9.5 lbs. (4,3 kg) for 1/4" valve
	11.0 lbs. (5,0 kg) for 3/8" valve

SERIES VALVE

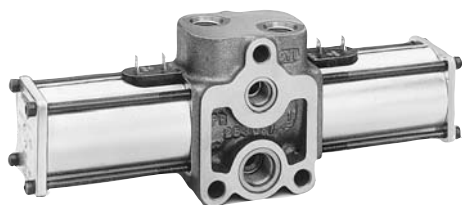


Series circuits unload the pump flow to tank when all 4-ways are in the center position. Pump flow passes through each valve making the pressure drops additive.

Series circuits have the capability, when energizing two valves, of positive motion of two functions by using exhaust flow from the upstream actuator.

Cautions to observe when applying valves in series circuits are pressure and flow intensification from differential cylinders and the effects of back pressure on upstream functions.

PARALLEL VALVE



Parallel circuits have pressure blocked in neutral and are generally used with pressure compensated pumps or some type of unloading valve.

Parallel circuits do not have the problems of pressure and flow intensification but will not insure motion of more than one actuator when two valves are energized at the same time.

PARALLEL WITH UNLOADING RELIEF

This circuit gives the advantages of parallel with the added feature of unloading a fixed displacement pump.

The circuit incorporates a normally open solenoid operated relief to unload the pump. The solenoid on the relief valve is wired so that it is energized every time a valve is actuated and closes the vent on the relief valve.

Directional Controls (4-Way)

MODEL MD04, 1/4" SERIES VALVES, SOLENOID OPERATED WORK SECTIONS

Section seals included.

Order Code	Bill of Material #	SAE 8 Inlet, Work Ports, Exhaust	Solenoid Options		Spool Options			Spool Options	
			Double [C]	Single [H]	Single Lock Valve [R]	Double Lock Valve [S]	Crossover Reliefs [D]	4-Way 3-Position [D]	4-Way Free Flow [B]
MD04-SDNC-AB-12B	994542-12B	•	•						•
MD04-SDNC-AD-12B	994511-12B	•	•					•	
MD04-SDNH-AD-12B	994546-12B	•		•				•	
MD04-SDNC-RD-12B	994543-12B	•	•		•			•	
MD04-SDNC-SD-12B	994527-12B	•	•			•		•	
MD04-SDNC-DD-12B	994526-12B	•	•				•	•	



Model MD04

MODEL MD04 - 1/4" PARALLEL VALVES, SOLENOID OPERATED WORK SECTIONS

Section seals included.

Order Code	Bill of Material #	Port Sizes		Solenoid Options			Bolt-on Options			Spool Options			
		SAE 6 Inlet	SAE 8 Work Pt., Exhaust	Double [C]	Single [H]	2-Pos. Offset [A]	Single Lock Vlv. [R]	Double Lock Vlv. [S]	Crossover Reliefs [D]	Closed Center [A]	A & B To Tank [J]	Free Flow [B]	2-Pos. [M]
MD04-PDNC-AA-12B	994624-12B	•	•	•						•			
MD04-PDNC-AJ-12B	994625-12B	•	•	•							•		
MD04-PDNC-AB-12B	994092-12B	•	•	•								•	
MD04-PDNH-AA-12B	994661-12B	•	•		•					•			
MD04-PDNA-AM-12B	994615-12B	•	•			•							•
MD04-PDNC-RJ-12B	994660-12B	•	•	•			•				•		
MD04-PDNC-SA-12B	994635-12B	•	•	•				•		•			
MD04-PDNC-SJ-12B	994617-12B	•	•	•				•			•		
MD04-PDNC-DA-12B	994088-12B	•	•	•					•	•			

SAE 1/4" blade terminals, 12 VDC, standard. Consult factory for other options.



Model MD04

MODEL MD06, 3/8" SERIES VALVES, SOLENOID OPERATED WORK SECTIONS

Section seals included.

Order Code	Bill of Material #	SAE 8 Inlet, Work Ports, Exhaust	Solenoid Options		Bolt-on Options			Spool Options	
			Double [C]	Single [H]	Single Lock Valve [R]	Double Lock Valve [S]	Crossover Reliefs [D]	4-Way 3-Position [D]	4-Way Free Flow [B]
MD06-SDNC-AB-12B	999404-12B	•	•						•
MD06-SDNC-AD-12B	999401-12B	•	•					•	
MD06-SDNH-AD-12B	999408-12B	•		•				•	
MD06-SDNC-RD-12B	999413-12B	•	•		•			•	
MD06-SDNC-SD-12B	999427-12B	•	•			•		•	
MD06-SDNC-DD-12B	999424-12B	•	•				•	•	

SAE 1/4" blade terminals, 12 VDC, standard. Consult factory for other options.

GRESEN® Directional Control Valves

Directional Controls (4-Way)

Inlet Relief Valve Section, 1/4" and 3/8" (Series)

Section seals included.

Order Code	Bill of Material #	SAE 8 Ports	2-Stage Relief [F]	Pressure Setting 3000 PSI [N]
MR-06-RFN	994436	•	•	•

Section Stud Assembly Kits, 1/4" and 3/8" (Series) With Inlet Relief Section

Includes tie bolts, mounting feet and nameplate.

Order Code	Bill of Material #	Number of Work Sections
K-708162 w/Relief	708162	One Section
K-708163 w/Relief	708163	Two Section
K-708164 w/Relief	708164	Three Section
K-708155 w/Relief	708155	Four Section
K-708156 w/Relief	708156	Five Section

Without Inlet Relief Section

Order Code	Bill of Material #	Number of Work Sections
K-707871	707871	One Section
K-707872	707872	Two Section
K-707873	707873	Three Section
K-707874	707874	Four Section
K-707875	707875	Five Section



Model MD06

MODEL MD06-3/8" PARALLEL VALVES, SOLENOID OPERATED WORK SECTIONS

Section seals included.

Order Code	Bill of Material #	Port Sizes		Solenoid Options			Bolt-on Options			Spool Options			
		SAE 6 Inlet	SAE 8 Work Pt., Exhaust	Double [C]	Single [H]	2-Pos. Offset [A]	Single Lock Viv. [R]	Double Lock Viv. [S]	Crossover Reliefs [D]	Closed Center [A]	A & B To Tank [J]	Free Flow [B]	2-Pos. [M]
MD06-PDNC-AA-12B	999300-12B	•	•	•						•			
MD06-PDNC-AJ-12B	999305-12B	•	•	•							•		
MD06-PDNC-AB-12B	999301-12B	•	•	•								•	
MD06-PDNH-AA-12B	999320-12B	•	•		•					•			
MD06-PDNA-AM-12B	999341-12B	•	•			•							•
MD06-PDNC-RA-12B	999375-12B	•	•	•			•			•			
MD06-PDNC-RJ-12B	999311-12B	•	•	•			•				•		
MD06-PDNC-SA-12B	999334-12B	•	•	•				•		•			
MD06-PDNC-SJ-12B	999306-12B	•	•	•				•			•		
MD06-PDNC-DA-12B	999321-12B	•	•	•					•	•			

SAE 1/4" blade terminals, 12 VDC, standard. Consult factory for other options.

TWO-POSITION THREE-WAY (FLOAT POSITION) VALVES

Features

- Pressure Balanced Spool
- Chrome Plated Spool
- High-Tensile Cast Iron Body
- Easy to Mount

The Models H and HM Float Position Valves are used with standard 4-way, 3-position valves to provide a float or freewheeling position. These valves are designed for snow plows, loaders, winches and similar equipment applications which may require the optional function of having a cylinder able to “float” or a motor to “free-wheel”.

The hydraulic circuit which is to be operated should be selected before pressure is applied.

MODEL H

MODEL HM



Model H

Model HM



Specifications

	H	HM
Capacity (nominal):	.25 GPM (94 litres/min)	10 GPM (37 litres/min)
Maximum Operating Pressure:	.3000 PSI (207 bar)	2000 PSI (138 bar)
Shipping Weight:	.5½ lbs (2,5 kg)	2¾ lbs (1,3 kg)

TWO-POSITION THREE-WAY (SELECTOR) VALVES

MODEL S

3 SIZES FROM WHICH TO CHOOSE

S-50 • S-75 • S-100



Features

- Pressure Balanced Spool
- Chrome Plated Spool
- High-Tensile Cast Iron Body
- Easy to Mount

The Model S, Two-Position, Selector Valves offer a simple method of directing the flow of hydraulic oil to two separate hydraulic lines. The addition of these Selector Valves to the hydraulic circuit will permit operation of two single-acting cylinders with one three-way control valve. In some applications, two double acting cylinders may be operated with one 4-way control valve.

The hydraulic circuit which is to be operated should be selected before pressure is applied.

Valve Spool is of the open crossover type. As Spool is moved and one outlet port starts to close, the other outlet port starts to open.

Three sizes; 15 GPM (56 litres/min), 24 GPM (90 litres/min), and 40 GPM (151 litres/min) permit selection for any application

Specifications

	S-50	S-75	S-100
Capacity (nominal):	15 GPM (56 litres/min)	24 GPM (90 litres/min)	40 GPM (151 litres/min)
Maximum Operating Pressure:	3000 PSI (207 bar)	3000 PSI (207 bar)	3000 PSI (207 bar)
Shipping Weight:	2 ³ / ₄ lbs (1,3 kg)	5 ¹ / ₂ lbs (2,5 kg)	9 ¹ / ₂ lbs (4,3 kg)

TWO-POSITION THREE-WAY (SELECTOR) VALVE

MODEL SM

Features

- Pressure Balanced Spool
- Chrome Plated Spool
- High-Tensile Cast Iron Body

The Model SM, Two-Position, Selector Valve is a two-way hydraulic selector offering a simple method of directing the flow of oil in a hydraulic system to two separate hydraulic lines. The addition of this Selector Valve to the hydraulic system will permit operation of two single-acting cylinders with one three-way control valve. In some applications, two double acting cylinders may be operated with one 4-way control valve.

The hydraulic circuit which is to be operated should be selected before pressure is applied.

Valve Spool is of the open crossover type. As Spool is moved and one outlet port starts to close, the other outlet port starts to open.

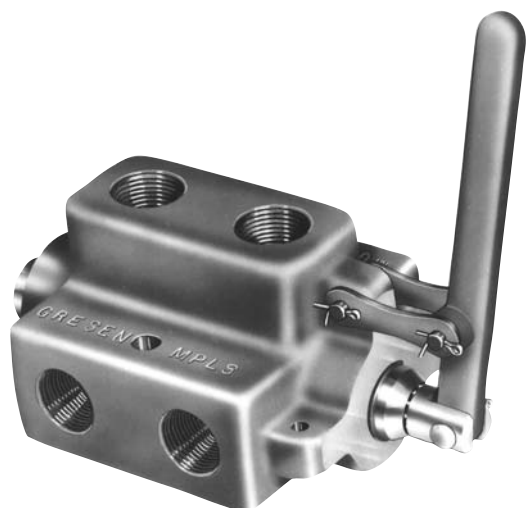


Specifications

	SM
Capacity (nominal):	.20 GPM (75 litres/min)
Maximum Operating Pressure:	.2000 PSI (138 bar)
Shipping Weight:	.2 ³ / ₄ lbs (1,3 kg)

TWO-POSITION SIX-PORTED (SELECTOR) VALVE

MODEL DS



Features

- Pressure Balanced Spool
- Chrome Plated Spool
- High-Tensile Cast Iron Body
- Three Handle Position Options

The Model DS, Two-position, Double selector Valve directs the flow of hydraulic oil to two separate circuits. This permits operation of two double-acting cylinders with one four-way control valve or four single-acting cylinders with two three-way control valves.

The hydraulic circuit which is to be operated should be selected before pressure is applied.

Valve Spool is of the open crossover type. As Spool is moved and one outlet port starts to close, the other outlet port starts to open.

Specifications

Capacity (nominal): 20 GPM (75 litres/min)

Maximum Operating Pressure:

Model DS-75 2000 PSI (138 bar)

Model DS-12 3000 PSI (207 bar)

Shipping Weight: 12 lbs (5,5 kg)

Directional Controls

MODEL HM 3-WAY (FLOAT) VALVES

(Two Position)

Order Code	Bill of Material #	Port Size	Reversed Spool [R]	Knob/Clevis Option
HM-38	07254035	3/8" NPT		Knob
HM-38-R	07254047	3/8" NPT	•	Knob
HM-50	07254019	1/2" NPT		Knob
HM-50-R	00983034	1/2" NPT	•	Knob
HM-50 w/Clevis	00983098	1/2" NPT		Clevis
H-75	07251015	3/4" NPT		Knob
HM-8	07254039	SAE 8		Knob
HM-8 w/Clevis	07254046	SAE 8		Clevis
H-12	07251019	SAE 12		Knob
H-12 w/Clevis	07251030	SAE 12		Clevis



Model HM

MODEL S SELECTOR VALVES

(Two Position)

Order Code	Bill of Material #	Port Size	Reversed Spool [R]	Knob/Clevis Option
S-50	07252004	1/2" NPT		Knob
S-50-L/Knob	07252001	1/2" NPT		—
S-50 w/Clevis	07252007	1/2" NPT		Clevis
S-50-R	07252006	1/2" NPT	•	Knob
S-50-R w/Clevis	07252023	1/2" NPT	•	Clevis
S-75	07251002	3/4" NPT		Knob
S-75 w/Clevis	07251004	3/4" NPT		Clevis
S-75-R	07251021	3/4" NPT	•	Knob
S-100	07253001	1" NPT		Knob
S-100-R	07253002	1" NPT	•	Knob
S-8	07252018	SAE 8		Knob
S-8 w/Clevis	07252029	SAE 8		Clevis
S-8-R	07252033	SAE 8	•	Knob
S-8-R-L/Knob	07252034	SAE 8	•	—
S-8-R w/Clevis	00983053	SAE 8	•	Clevis
S-10	07252012	SAE 10		Knob
S-10-L/Knob & Clevis	07252021	SAE 10		—
S-10 w/Clevis	07252045	SAE 10		Clevis
S-10-R-L/Knob & Clevis	07252056	SAE 10	•	—
S-10-R w/Clevis	07252013	SAE 10	•	Clevis
S-10-R w/Knob	07252025	SAE 10	•	Knob
S-12	07251010	SAE 12		Knob
S-12-L/Knob & Clevis	07251009	SAE 12		—
S-12 w/Clevis	07251018	SAE 12		Clevis
S-12-R	07251028	SAE 12	•	Knob
S-12-R w/Clevis	07251011	SAE 12	•	Clevis
S-16	07253007	SAE 16		Knob
S-16 L/Knob	07253019	SAE 16		—
S-16 w/Clevis	07253017	SAE 16		Clevis
S-16-R	07253008	SAE 16	•	Knob



Model S

GRESEN® Directional Control Valves

Directional Controls

MODEL SM SELECTOR VALVES



Model SM

Order Code	Bill of Material #	Port Size	Reversed Spool [R]	Knob/Clevis Option	Spring Loaded Spool	Detent
SM-38	07254009	3/8" NPT		Knob		
SM-38-L/Knob	07254007	3/8" NPT		—		
SM-38-R	07254056	3/8" NPT	•	Knob		
SM-38-R-L/Knob	07254008	3/8" NPT	•	—		
SM-38-S1	00983031	3/8" NPT		Knob	•	
SM-50	07254003	3/8" NPT		Knob		
SM-50 w/Clevis	07254006	1/2" NPT		Clevis		
SM-50 L/Clevis or Knob	07254022	3/8" NPT		—		
SM-50 w/1688 Clevis	07254060	1/2" NPT		Clevis		
SM-50-R	07254005	1/2" NPT	•	Knob		
SM-50-R-L/Knob	07254002	1/2" NPT	•	—		
SM-50-S1	00983037	1/2" NPT		Knob	•	
SM-50-S1 w/Clevis	07254031	1/2" NPT		Clevis	•	
SM-8	07254013	SAE 8		Knob		
SM-8-L/Knob	07254012	SAE 8		—		
SM-8 w/Clevis	07254016	SAE 8		Clevis		
SM-8 w/Detent & Clevis	00983115	SAE 8		Clevis		•
SM-8-R	07254014	SAE 8	•	Knob		
SM-8-R-L/Knob	07254024	SAE 8	•	—		
SM-8-R with Detents	00982922	SAE 8	•	Knob		•
SM-8-S1	07254057	SAE 8		Knob	•	
SM-8-S1 w/Clevis	07254065	SAE 8		Clevis	•	

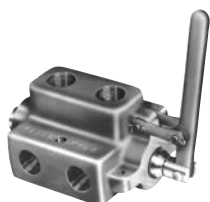
Option Kit

(Models S & SM)

Order Code	Bill of Material #	Description
K-S-CLV	08650235	Clevis and Washer replaces Knob for Models S and SM Selector.

MODEL DS DOUBLE SELECTOR VALVES

(Two Position)



Model DS

Order Code	Bill of Material #	Port Size	Knob/Handle Option	Detent	Viton
DS-75 w/Knob	07255021	3/4" NPT	Knob		
DS-75 w/Viton	07255029	3/4" NPT	Handle		•
DS-75 w/Handle Assy.	07255026	3/4" NPT	Handle		
DS-75-LCHA	07255023	3/4" NPT	LCHA		
DS-75-LHO	07255020	3/4" NPT	LHO		
DS-75 w/Detent w/Handle	00983146	3/4" NPT	Handle	•	
DS-12 w/Detent w/Handle	00983066	SAE 12	Handle	•	
DS-12 w/Handle Assy.	07255008	SAE 12	Handle		
DS-12-LCHA	07255010	SAE 12	LCHA		
DS-12-LHO	07255018	SAE 12	LHO		
DS-16-LCHA	07255012	SAE 16	LCHA		

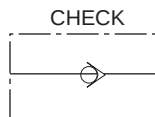
UNIDIRECTIONAL LINE CHECK (THROTTLE) VALVES

Features

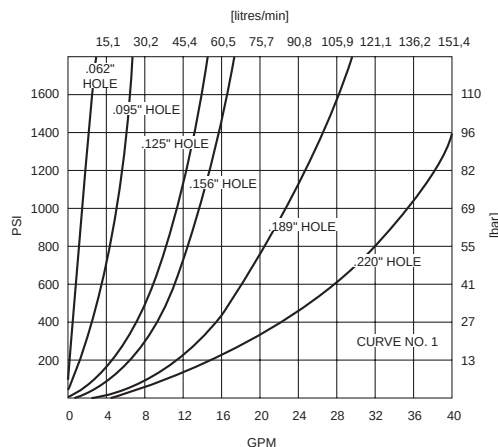
- Accurate control of Double-acting cylinder by having both sides of the piston pressurized.
- For improving control of the lowering stroke of a cylinder.
- For preventing cavitation of a cylinder or motor having an inertia load.
- For metering oil flow to a hydraulic motor for proper motor speed.
- For improving control of the extend stroke of a hydraulic cylinder.

Specifications

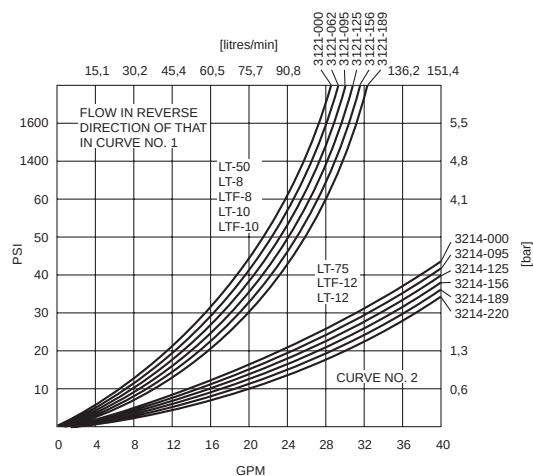
Maximum Operating Pressure: 3000 PSI (207 bar)



**FLOW CHARACTERISTICS THRU
RESTRICTED ORIFICE
(150 SUS OIL)**



**FREE FLOW PRESSURE DROP
(150 SUS OIL)**



**MODEL
LT**

**MODEL
LTF**



MODEL LT
MALE-FEMALE PORTS



MODEL LTF
FEMALE-FEMALE PORTS

The Model LT and LTF Valves will operate satisfactorily when installed in any position. These valves may be used as Line Check Valves, permitting full flow of hydraulic oil in one direction only or they may be used as restrictors.

An assortment of restrictors are available. When installed, the valve becomes a Line Throttle Valve permitting free flow of hydraulic oil in one direction and a restricted flow in the opposite direction.

An array of color-coded poppets allows easy and quick identification and simplifies conversions.

Check Valves



Model LT

MODEL LT LINE CHECK VALVES

Order Code	Bill of Material #	Port Size	Orifice
LT-50-0 W	07133001	1/2" NPT	None
LT-50-4 BR	07133010	1/2" NPT	.047
LT-50-6 P	07133002	1/2" NPT	.062
LT-50-8 PK	07133012	1/2" NPT	.078
LT-50-9 R	07133003	1/2" NPT	.095
LT-50-11 W	07133004	1/2" NPT	.109
LT-50-12 Y	07133005	1/2" NPT	.125
LT-50-14 O	07133006	1/2" NPT	.141
LT-50-15 G	07133007	1/2" NPT	.156
LT-50-18 BG	07133008	1/2" NPT	.189
LT-50-25 LB	07133009	1/2" NPT	.252
LT-75-00 W	07134001	3/4" NPT	None
LT-75-90R	07134002	3/4" NPT	.095
LT-75-120 Y	07134003	3/4" NPT	.125
LT-75-150 G	07134004	3/4" NPT	.156
LT-75-180 B	07134005	3/4" NPT	.189
LT-75-210 O	07134006	3/4" NPT	.220
LT-75-250 LB	07134007	3/4" NPT	.252
LT-75-310-LG	07134008	3/4" NPT	.314
LT-8-0 W	07135001	SAE 8	None
LT-8-4BR	07135010	SAE 8	.047
LT-8-6 P	07135002	SAE 8	.062

Order Code	Bill of Material #	Port Size	Orifice
LT-8-9 R	07135003	SAE 8	.095
LT-8-9R w/O-Ring	00983057	SAE 8	.095
LT-8-11 BW	07135004	SAE 8	.109
LT-8-12 Y	07135005	SAE 8	.125
LT-8-14 O	07135006	SAE 8	.141
LT-8-15 G	07135007	SAE 8	.156
LT-8-18 B	07135008	SAE 8	.189
LT-8-25 LB	07135012	SAE 8	.252
LT-10-0W	07137001	SAE 10	None
LT-10-0W w/O-Ring	00983085	SAE 10	None
LT-10-6 P	07137002	SAE 10	.062
LT-10-9 R	07137003	SAE 10	.095
LT-10-12 Y	07137005	SAE 10	.125
LT-10-18 B	07137008	SAE 10	.189
LT-10-14 O	07137006	SAE 10	.141
LT-12-00 W	07139001	SAE 12	None
LT-12-00 W w/O-Ring	00983092	SAE 12	None
LT-12-90 R	07139002	SAE 12	.095
LT-12-120 Y	07139003	SAE 12	.125
LT-12-180 B	07139005	SAE 12	.189
LT-12-250 LB	07139007	SAE 12	.252

MODELS LT and LTF, PARTS ONLY**LTF Bodies**

(Female-Female Ports)



Model LTF Body

Order Code	Bill of Material #	Description
K-LTF-8-BODY	08650316	SAE 8 Ports
K-LTF-10-BODY	08650315	SAE 10 Ports
K-LTF-12-BODY	08650311	SAE 12 Ports

LT Bodies

(Male-Female Ports)

Order Code	Bill of Material #	Description
K-LT-50-BODY	08650312	1/2" NPT Ports
K-LT-75-BODY	08650319	3/4" NPT Ports
K-LT-8-BODY	08650317	SAE 8 Ports
K-LT-10-BODY	08650318	SAE 10 Ports
K-LT-12-BODY	08650314	SAE 12 Ports

Check Valves

Taper Pins (Models LT or LTF)

Order Code	Bill of Material #	Description
K-LT-TP-1.50	08650349	1.50" Length for LT-50, LT-8, & LTF-8
K-LT-TP-1.75	08650347	1.75" Length for LT-10 & LTF-10
K-LT-TP-2.0	08650348	2.00" Length for LT-75, LT-12, & LTF-12

Option Kits (Models LT or LTF)

Throttle and Check Poppets for
Models LT-8, LT-10, LT-50, LTF-8, LTF-10

Poppet Order Symbol	Bill of Material #	Diameter of Hole in Poppet	Color
K-LT-4	08650431	.047	Brown
K-LT-6	08650432	.062	Purple
K-LT-8	08650433	.078	Pink
K-LT-9	08650434	.095	Red
K-LT-11	08650435	.109	Beige
K-LT-12	08650436	.125	Yellow
K-LT-14	08650437	.141	Orange
K-LT-15	08650438	.156	Lt. Green
K-LT-18	08650439	.189	Black
K-LT-25	08650440	.252	Lt. Blue
K-LT-0	08650326	Check (No Hole)	White

Throttle and Check Poppets for
Models LT-12, LT-75, LTF-12

Poppet Order Symbol	Bill of Material #	Diameter of Hole in Poppet	Color
K-LT-90	08650441	.095	Red
K-LT-120	08650442	.125	Yellow
K-LT-150	08650443	.156	Green
K-LT-180	08650444	.189	Black
K-LT-210	08650445	.220	Orange
K-LT-250	08650446	.252	Lt. Blue
K-LT-280	08650447	.281	Purple
K-LT-310	08650448	.314	Lt. Grey
K-LT-00	08650313	Check (No Hole)	White

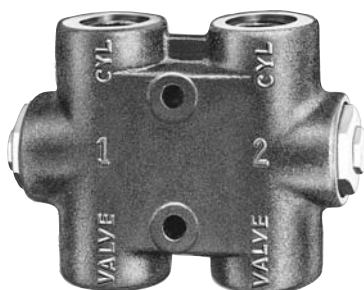
LOCK VALVES

PILOT OPERATED CHECK VALVES

MODEL LO

MODEL LOA

MODEL LO
STANDARD



MODEL LOA

LO and LOA Lock Valves are designed to lock a cylinder, or part of a circuit, without leakage while a control valve is in a neutral position. Lock Valves function as check valves, allowing flow to a cylinder and blocking reverse flow until pilot pressure is applied to "unlock" the circuit.

These valves may be used to prevent movement of a load while the pressure source is inactive.

Features

- Hardened Seats
- Ball/Spring Checks
- High-Tensile Cast Iron Body

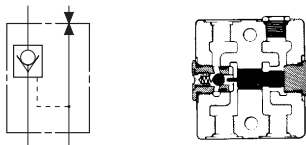
Specifications

	LO	LOA
Capacity (nominal):	.25 GPM (94 litres/min)	10 GPM (37 litres/min)
Maximum Operating Pressure:	.3000 PSI (207 bar)	3000 PSI (207 bar)
Shipping Weight:	.6 lbs (2,7 kg)	2¾ lbs (1,3 kg)

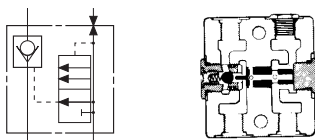
TYPES AVAILABLE

Besides model variations in port sizes and capacities, three different types are available.

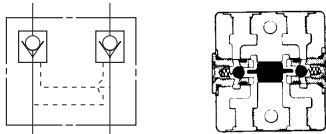
SINGLE TYPE (S), Designed for use with a single-acting cylinder or to lock one side of a double-acting cylinder.'



SINGLE-UNLOADING TYPE (SU), available on Model LO only. May be used only with single-acting cylinders. This type unloads the pump after unlocking the circuit. "U" is stamped on the construction plug for identification.

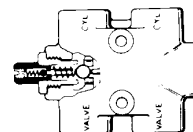


DOUBLE-TYPE (D), used with a double-acting cylinder or motor where it is necessary to lock in two directions.

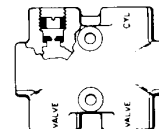


OPTIONS

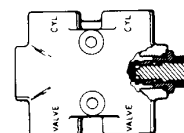
EXPANSION RELIEF (R), prevents build up of pressure in a locked circuit due to temperature rise.



ORIFICE RESTRICTOR (T), restricts rate of return flow after unloading prevents chattering by maintaining unloading pressure. Not available for Model LOA.



MANUAL UNLOCK (M), enables circuit to be unlocked manually in event that hydraulic unlocking pressure is insufficient. For S and SU options only. Not available for Model LOA.



LOCK VALVES PILOT OPERATED CHECK VALVES

MODEL LD1 MODEL LD2

Lock valves are designed to lock a cylinder, or part of a circuit, without leakage while the control valve is in neutral position. Lock valves function as check valves, allowing flow to a cylinder and blocking reverse flow until pilot pressure is applied to “unlock” the circuit.

Model LD1 and LD2 lock valves incorporate a two-stage poppet design which minimizes shock. These valves provide prolonged holding of cylinder position and smooth operation throughout the entire pressure range.

Specifications

Flow Rating (nominal):

1/4"	.8 GPM (30 litres/min.)
3/8" & 1/2"	.25 GPM (95 litres/min.)

Maximum Operating Pressure: 3000 PSI (207 bar)

Seals: Viton

Filtration: 10 micron

Decompression Ratio (nominal):

1/4" Single	10:1
1/4" Double	8:1
3/8" & 1/2" Single	1.4:1
3/8" & 1/2" Double	1:1

Opening Ratio:

1/4" Single	1.3:1
1/4" Double	1:1
3/8" & 1/2" Single	1.4:1
3/8" & 1/2" Double	1:1

Weights (approx.):

1/4" Single	1.25 lbs (0,57 kg)
1/4" Double	1.75 lbs (0,79 kg)
3/8" & 1/2" Single	2.5 lbs (1,13 kg)

LD1

PILOT OPERATED CHECK VALVES

Nominal Flows of 8 and 25 GPM

3000 PSI, 1/4", 3/8" and 1/2"



Specifications

Flow Rating (nominal): 50 GPM 190 litres/min.)

Maximum Operating Pressure: 3000 PSI (207 bar)

Seals: Viton

Filtration: 10 micron

Decompression Ratio (nominal): 12:1

Opening Ratio: 1:1

Weights (approx.):

Single Valve	6 lbs (2,72 kg)
Double Valve	10 lbs 8 oz (4,76 kg)

LD2

PILOT OPERATED CHECK VALVES

Nominal Flow of 50 GPM

3000 PSI, SAE 16 Ports



Lock Valves



Model LO



Model LOA

MODEL LO LOCK VALVES

Pilot Operated Check Valve

Order Code	Bill of Material #	Type	Port Size	Thermal Relief Location [R]*	Restrictor Location [T]
LO-50-S	07259007	Single	1/2" NPT		
LO-50-S-M2	07259006	Single	1/2" NPT	Side 2	
LO-50-S-R1	07259004	Single	1/2" NPT	Side 1	
LO-50-S-R2	07259005	Single	1/2" NPT	Side 2	
LO-50-SU	07259009	Single Unloading	1/2" NPT		
LO-50-SU-M	07259065	Single Unloading	1/2" NPT		
LO-50-D	07259016	Double	1/2" NPT		
LO-50-D-R1	07259011	Double	1/2" NPT	Side 1	
LO-50-D-R1-R2	07259010	Double	1/2" NPT	Side 1 & 2	
LO-50-D-R1-R2 LP	07259037	Double	1/2" NPT	Side 1 & 2	
LO-50-D-R2	07259012	Double	1/2" NPT	Side 2	
LO-50-D-R2 LP	07259038	Double	1/2" NPT	Side 2	
LO-10-S	07259020	Single	SAE 10		
LO-10-S-M2	07259059	Single	SAE 10		
LO-10-S-R1	07259062	Single	SAE 10	Side 1	
LO-10-SU	07259061	Single Unloading	SAE 10		
LO-10-SU-T1	07259055	Single Unloading	SAE 10		Side 1
LO-10-D	07259023	Double	SAE 10		
LO-10-D w/HD Piston	07259063	Double	SAE 10		
LO-10-D-R1 HP	07259021	Double	SAE 10	Side 1	
LO-10-D-R1 LP	07259046	Double	SAE 10	Side 1	
LO-10-D-T1	07259022	Double	SAE 10		Side 1
LO-10-D-T1-T2	07259058	Double	SAE 10		Side 1 & 2
LO-10-D-T1-T2-R1-R2	07259026	Double	SAE 10	Side 1 & 2	Side 1 & 2

*Thermal relief set @ 3500 PSI ± 350 PSI.

MODEL LOA LOCK VALVES

Pilot Operated Check Valve

Order Code	Bill of Material #	Type	Port Size	Thermal Relief [R]* Location	Manifold Mount [C]
LOA-25-S	07260002	Single	1/4" NPT		
LOA-25-S-R1	07260001	Single	1/4" NPT	Side 1	
LOA-25-D	07260005	Double	1/4" NPT		
LOA-25-D-R1	07260018	Double	1/4" NPT	Side 1	
LOA-38-D	07260009	Double	3/8" NPT		
LOA-38-D-R1	07260011	Double	3/8" NPT	Side 1	
LOA-6-S	07260012	Single	SAE 6		
LOA-6-D	07260008	Double	SAE 6		
LOA-6-D-R1	07260026	Double	SAE 6	Side 1	
LOA-C-25-S	07260014	Single	1/4" NPT		•
LOA-C-25-D	07260015	Double	1/4" NPT		•
LOA-C-25-D-R1	07260028	Double	1/4" NPT	Side 1	•
LOA-C-25-D-R1-R2	07260025	Double	1/4" NPT	Side 1 and 2	•
LOA-C-6-S	07260029	Single	SAE 6		•
LOA-C-6-S-R1	07260031	Single	SAE 6	Side 1	•
LOA-C-6-D-R1-R2	07260024	Double	SAE 6	Side 1 and 2	•

*Thermal relief set @ 3500 PSI ± 350 PSI.

Lock Valves

Option Kits

Pilot Operated Check Valve

Order Code	Bill of Material #	Description
K-LO-R5-4000	08650374	Thermal Relief Set @ 4000 PSI for LO Lock Valve
K-LOA-R3-4000	08650373	Thermal Relief Set @ 4000 PSI for LOA Lock Valve
K-LO-M	08650263	Manual Unlock for Single Type LO Valves only



Model LD1

MODEL LD1 LOCK VALVES

Pilot Operated Check Valve

Order Code	Bill of Material #	Type	Port Size	Thermal Relief [T]	Piston O-Ring [R]
LD1-25-1S	2989238	Single	1/4" NPT		
LD1-25-1SR	2987426	Single	1/4" NPT		•
LD1-25-1D	2989232	Double	1/4" NPT		
LD1-25-1DR	2988493	Double	1/4" NPT		•
LD1-25-1DT	2989272	Double	1/4" NPT	•	
LD1-25-1DTT	2982649	Double	1/4" NPT	•	
LD1-38-1S	2989256	Single	3/8" NPT		
LD1-38-1D	2989222	Double	3/8" NPT		
LD1-38-1DR	2982287	Double	3/8" NPT		•
LD1-50-1S	2989254	Single	1/2" NPT		
LD1-50-1D	2987360	Double	1/2" NPT		
LD1-50-1DR	2982235	Double	1/2" NPT		•
LD1-06-2S	2987346	Single	SAE 6		
LD1-06-2SR	2982503	Single	SAE 6		•
LD1-06-2D	2987372	Double	SAE 6		
LD1-06-2DT	2982463	Double	SAE 6	•	
LD1-08-2S	2987790	Single	SAE 8		
LD1-08-2SR	2982451	Single	SAE 8		•
LD1-08-2ST	2988459	Single	SAE 8	•	
LD1-08-2D	2987789	Double	SAE 8		
LD1-08-2DR	2982839	Double	SAE 8		•
LD1-10-2D	2989224	Double	SAE 10		

*Thermal relief set @ 3800 PSI ± 200 PSI.

MODEL LD2 LOCK VALVES

Pilot Operated Check Valve

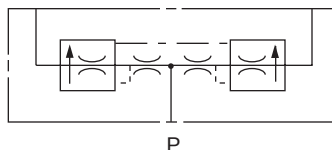
Order Code	Bill of Material #	Type	Port Size
LD2-16-2S	2982734	Single	SAE 16
LD2-16-2D	2982575	Double	SAE 16



Model LD2

PROPORTIONAL TYPE — PRESSURE COMPENSATED FLOW DIVIDER WITH OPTIONAL COMBINER FEATURE

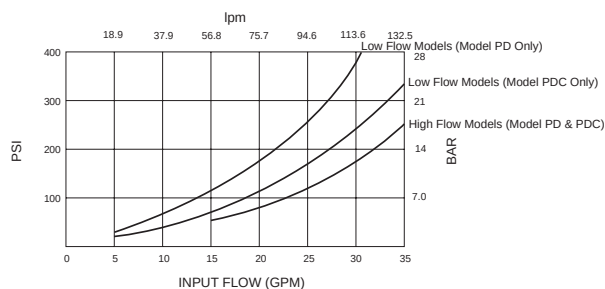
MODEL PD MODEL PDC



MODELS PD AND PDC PRESSURE DROP

Typical results derived from laboratory tests run with
150 SUS oil at 100°F (37,81°C)

IN DIVIDER MODE FROM
INLET TO JOINED LEGS



The Model PD, Proportional-Type, Pressure-Compensated Flow Divider offers an efficient means of proportionally dividing a single flow of hydraulic oil. The flow ratio from the outlet ports remains constant despite load differences between the ports. Outlet flow ratios are preset at the factory and a range of ratios from 50/50 to 90/10 are available.

Flow through the Model PD Divider cannot be reversed. It is a flow divider only – not a flow combiner.

A Model PDC with a combiner feature is offered by substituting a combiner spool assembly for a standard spool. This feature not only divides flow, but flow may be combined in reverse direction and synchronized in both directions. It is only available with a 50/50 flow dividing ratio. If other ratios are required with the combiner feature, consult the factory.

Model PD and PDC Flow Dividers will divide the inlet flow to $\pm 10\%$ of the specified, major output flow when used within recommended capacities. Neither model, however, should be construed as a flow regulator.

In many applications, actuators can displace fluid different from the ratio of the divider and lockup. A means of re-phasing the actuators is recommended.

Features

- Pressure Compensated.
- Optional Model PDC Synchronizes in Both Directions.
- Cross-Drilled, Shifting-Type Spool – provides extremely accurate metering.
- Six Ratios Available in Model PD.
- High-Tensile, Cast Iron Body.
- Hardened Metering Spool.

Specifications

Capacity (nominal)

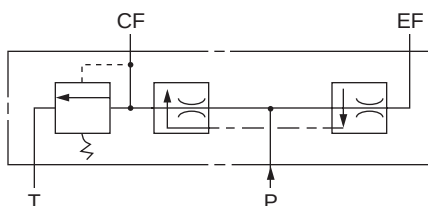
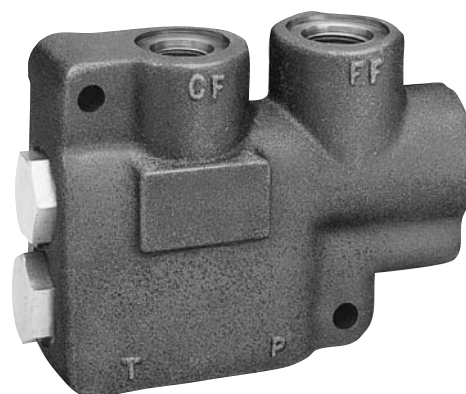
Low Flow Models: 5-20 GPM (18-94 litres/min)
High Flow Models: 20-35 GPM (56-132 litres/min)
Maximum Operating Pressure: 2500 PSI (172 bar)
Shipping Weight: Approx. 7 lbs (3,2 kg)

CONSTANT VOLUME/PRIORITY TYPE FLOW DIVIDER

MODEL CFD

Features

- Integral Relief Valve in Constant Flow Circuit. (Adjustable with shims) Also available without Relief Valve (NR).
- Cross-Drilled, Shifting-Type Spool – provides extremely accurate metering.
- Ten Metering Spool Sizes Available.
- High Strength, Cast Iron Body.
- Hardened Metering Spools Are Interchangeable.



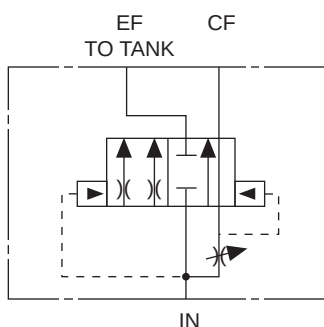
Gresen's Model CFD, Constant-Volume, Priority-Type Flow Divider is designed for power steering systems and other applications where two separate hydraulic power circuits are to be served from a single pump. Hydraulic oil is divided into two separate flows. One, a constant flow (regardless of input pressure) and the other, a flow in excess of the constant flow. Flow can be reversed through the Controlled Flow Work Port but is not pressure compensated. Hydraulic oil flow through the Excess Flow Port cannot be reversed. The constant flow output is determined by the type of Metering Spool which is installed.

Specifications

Input Capacity (nominal): 20 GPM (75 litres/min)
 Maximum Operating Pressure: 3000 PSI (207 bar)
 Constant-Flow Relief Valve
 Pressure Setting: Up to 2500 PSI (172 bar) (Cracking)
 Shipping Weight: 8 lbs. (3,6 kg)

PRESSURE COMPENSATED-ADJUSTABLE FLOW DIVIDER

MODEL CFDA



Gresen's Model CFDA Adjustable Flow Divider offers an inexpensive, dependable means of obtaining flow adjustment up to 15 GPM (15,8 litres/min.). Provides easy manual control where frequent flow change is required. Pressure compensation provides a smooth, constant output flow regardless of pressure changes at the Controlled Flow Work Port.

Rotating the adjusting knob varies the flow from the Controlled Flow Work Port. After the controlled flow demand is satisfied, the balance of the inlet flow passes through the Excess Flow Port and returns to the tank. The Excess Flow Port is not a work port.

Flow through the Controlled Flow Work Port can be reversed but is not pressure compensated. The Model CFDA is not available with a built-in relief valve.

Features

- Adjustable Flow Rate.
- Cross-Drilled, Shifting-Type Spool – provides extremely accurate metering.
- High Strength, Cast Iron Body.
- Hardened Metering Spool.

Specifications

Capacity (nominal) Adjustable: Up to 15 GPM (56 litres/min)
Maximum Operating Pressure: 2500 PSI (172 bar)
Flow Adjustment: Approx. 6 turns of knob
 from min. to max. flow
Shipping Weight: 8 lbs. (3,6 kg)

HOW TO USE THE PRESSURE DROP DATA

Example:

With a 15 GPM (56,8 litres/min) pump outlet, adjust Control Knob to deliver 3 GPM (11,4 litres/min) thru CF port. Pressure drop thru CF port is 4 PSI (0,3 bar), while remaining 12 GPM (45,4 litres/min) flow is directed thru EF port with 35 PSI (2,4 bar) pressure drop.

PRESSURE DROP

Typical Test Figures Using 150 SUS Oil at 100°F (37,8°C)

OUTPUT GPM (litres/min)	PRESSURE DROP THRU CF PORT PSI (bar)	PRESSURE DROP THRU EF PORT PSI (bar)
3 (11,3)	4 (0,2)	45 (3,1)
6 (22,7)	7 (0,4)	43 (2,9)
9 (34,0)	17 (1,1)	40 (2,7)
12 (45,4)	28 (1,9)	35 (2,4)
15 (56,7)	40 (2,7)	32 (2,2)

PRIORITY TYPE FLOW DIVIDER

Features

- Differential Poppet Relief Valve In The Controlled Flow Circuit — also available without relief valve (NR).
- Available With Adjustable or Non-Adjustable Flow To The Controlled Flow Circuit.
- Adjustable Divider Offers 12 Flow Adjustment Positions (Positive Detents) in 360° Rotation Of Knob.
- Non-Adjustable Divider Has An Interchangeable Orifice Restrictor In The Spool – to change flow, simply change orifice restrictor – not the spool.
- High Strength, Cast Iron Body.
- Hardened Metering Spool.
- Excess Flow Can Be Used In A Secondary Circuit.

Gresen's Model DC25 Priority Flow Divider is designed for applications where two separate hydraulic power circuits are to be served from a single pump. The Flow Divider provides priority flow to the primary circuit, and any excess flow to a secondary circuit or tank.

An optional hand adjusting knob with 12 positive detent positions is available for readily adjusting the flow from 1 to 20 GPM (3,8 to 76 litres/min) at the controlled-flow port.

MODEL DC25



Operation

Flow enters the inlet port and passes through a control orifice. The control orifice is of fixed size in the non-adjustable unit or can be varied externally in the adjustable unit.

Flow through the control orifice causes a pressure drop, which is sensed across the compensator spool. Any tendency to exceed the flow setting increases this pressure drop causing the spool to shift and bypass the excess flow. If the secondary circuit (excess flow) pressure is greater than the controlled-flow pressure, the spool will shift even further and begin to throttle the controlled-flow to maintain the preset flow.

If the controlled-flow port is blocked, the compensator spool will return to the closed position allowing no flow through the Flow Divider. To protect the system, if this condition occurs, an optional differential poppet relief valve may be installed in the controlled-flow circuit to insure flow to the secondary circuit under all operating conditions.

Specifications

Capacity (nominal):

Input Flow Up To 30 GPM (113 litres/min)
Adjustable Controlled-Flow Range 1 to 20 GPM
 (3,8 to 76 litres/min)

Adjustable Controlled-Flow Range (14 Orifice Sizes Available) 1 to 16 GPM
 (3,8 to 62 litres/min)

Maximum Operating Pressure: *3500 PSI (242 bar)

Control Accuracy of Controlled-Flow: ±10%

Minimum Operating Pressure Drop: 70 PSI (4,8 bar)

Shipping Weight: 8 lbs. (3,6 kg)

Filtration Required (Min.): 33 micrometre

Flow Dividers

MODELS PD FLOW DIVIDERS and PDC FLOW DIVIDER/COMBINER

(Proportional Type)



Model PD/PDC

Order Code	Bill of Material #	Flow Rating	Pressure Rating	Port Size	Flow Dividing Ratio
PD-50-50	07262001	5-20 GPM	2000 PSI	1/2" NPT	50/50
PD-50-60	07262004	5-20 GPM	2000 PSI	1/2" NPT	60/40
PD-50-67	07262003	5-20 GPM	2000 PSI	1/2" NPT	66w/d/33q/d
PD-50-70	07262002	5-20 GPM	2000 PSI	1/2" NPT	70/30
PD-50-75	07262005	5-20 GPM	2000 PSI	1/2" NPT	75/25
PD-50-80	07262019	5-20 GPM	2000 PSI	1/2" NPT	80/20
PD-50-90	07262023	5-20 GPM	2000 PSI	1/2" NPT	90/10
PD-75-50	07262006	20-35 GPM	2000 PSI	3/4" NPT	50/50
PD-75-60	07262011	20-35 GPM	2000 PSI	3/4" NPT	60/40
PD-75-67	07262010	20-35 GPM	2000 PSI	3/4" NPT	66w/d/33q/d
PD-75-70	07262009	20-35 GPM	2000 PSI	3/4" NPT	70/30
PD-75-75	07262012	20-35 GPM	2000 PSI	3/4" NPT	75/25
PD-75-80	07262008	20-35 GPM	2000 PSI	3/4" NPT	80/20
PD-75-90	07262007	20-35 GPM	2000 PSI	3/4" NPT	90/10
PD-8-50	00982928	5-20 GPM	2500 PSI	SAE 8	50/50
PD-10-50	07262026	5-20 GPM	2500 PSI	SAE 10	50/50
PD-10-60	00983042	5-20 GPM	2500 PSI	SAE 10	60/40
PD-10-67	07262025	5-20 GPM	2500 PSI	SAE 10	66w/d/33q/d
PD-12-50	07262038	20-35 GPM	2500 PSI	SAE 12	50/50
PD-12-67	07262040	20-35 GPM	2500 PSI	SAE 12	66w/d/33q/d
PDC-50-50	08435001	5-20 GPM	2000 PSI	1/2" NPT	50/50
PDC-75-50	08435002	20-35 GPM	2000 PSI	3/4" NPT	50/50
PDC-8-50	08435020	5-20 GPM	2500 PSI	SAE 8	50/50
PDC-10-50	08435011	5-20 GPM	2500 PSI	SAE 10	50/50
PDC-12-50	08435017	20-35 GPM	2500 PSI	SAE 12	50/50

Option Kits (Model PD)

Order Code	Bill of Material #	Description	Model
K-PD-50-60	08650247	60% — 40% Spool Kit	PD-50
K-PD-75-60	08650248	60% — 40% Spool Kit	PD-75
K-PD-50-70	08650249	70% — 30% Spool Kit	PD-50

Flow Dividers

MODEL CFD FLOW CONTROL

(Priority Type)

Order Code	Bill of Material #	Port Sizes	Constant Flow	Relief Setting
CFD-50-1.5	07261001	1/2" NPT	1.5 GPM	500-1500 PSI
CFD-50-1.5-HP	07261002	1/2" NPT	1.5 GPM	1500-2500 PSI
CFD-50-1.5-HP-2000	08650687	1/2" NPT	1.5 GPM	2000 PSI
CFD-50-1.5-NR	07261069	1/2" NPT	1.5 GPM	None
CFD-50-2	07261003	1/2" NPT	2 GPM	500-1500 PSI
CFD-50-2-HP	07261004	1/2" NPT	2 GPM	1500-2500 PSI
CFD-50-2-NR	07261106	1/2" NPT	2 GPM	None
CFD-50-3	07261005	1/2" NPT	3 GPM	500-1500 PSI
CFD-50-3-HP	07261006	1/2" NPT	3 GPM	1500-2500 PSI
CFD-50-3-NR	07261064	1/2" NPT	3 GPM	None
CFD-50-4	07261059	1/2" NPT	4 GPM	500-1500 PSI
CFD-50-4-HP	07261009	1/2" NPT	4 GPM	1500-2500 PSI
CFD-50-4-HP-2000	08650686	1/2" NPT	4 GPM	2000 PSI
CFD-50-4-NR	07261007	1/2" NPT	4 GPM	None
CFD-50-5	07261011	1/2" NPT	5 GPM	500-1500 PSI
CFD-50-5-HP	07261012	1/2" NPT	5 GPM	1500-2500 PSI
CFD-50-5-NR	07261010	1/2" NPT	5 GPM	None
CFD-50-6	07261013	1/2" NPT	6 GPM	500-1500 PSI
CFD-50-6-HP	07261014	1/2" NPT	6 GPM	1500-2500 PSI
CFD-50-6-NR	00983138	1/2" NPT	6 GPM	None
CFD-50-7	07261015	1/2" NPT	7 GPM	500-1500 PSI
CFD-50-7-NR	07261016	1/2" NPT	7 GPM	None
CFD-50-8	07261017	1/2" NPT	8 GPM	500-1500 PSI
CFD-50-8-HP	07261018	1/2" NPT	8 GPM	1500-2500 PSI
CFD-50-9	07261019	1/2" NPT	9 GPM	500-1500 PSI
CFD-50-9-HP	07261020	1/2" NPT	9 GPM	1500-2500 PSI
CFD-50-10-NR	07261086	1/2" NPT	10 GPM	None
CFD-50-10-HP	00983228	1/2" NPT	10 GPM	1500-2500 PSI
CFD-75-1.5	07261023	3/4" NPT	1.5 GPM	500-1500 PSI
CFD-75-1.5 NR	07261105	3/4" NPT	1.5 GPM	None
CFD-75-2-HP	07261026	3/4" NPT	2 GPM	1500-2500 PSI
CFD-75-2-NR	07261084	3/4" NPT	2 GPM	None
CFD-75-3	07261028	3/4" NPT	3 GPM	500-1500 PSI
CFD-75-3-HP	07261029	3/4" NPT	3 GPM	1500-2500 PSI
CFD-75-4	07261030	3/4" NPT	4 GPM	500-1500 PSI
CFD-75-4-HP	07261031	3/4" NPT	4 GPM	1500-2500 PSI
CFD-75-4-HP-2000	08650685	3/4" NPT	4 GPM	2000 PSI
CFD-75-4-NR	07261080	3/4" NPT	4 GPM	None
CFD-75-5	07261033	3/4" NPT	5 GPM	500-1500 PSI
CFD-75-5-HP	07261034	3/4" NPT	5 GPM	1500-2500 PSI
CFD-75-5-NR	07261032	3/4" NPT	5 GPM	None
CFD-75-6	07261036	3/4" NPT	6 GPM	500-1500 PSI
CFD-75-6-HP	07261037	3/4" NPT	6 GPM	1500-2500 PSI
CFD-75-6-NR	07261035	3/4" NPT	6 GPM	None



Model CFD

Flow Dividers

MODEL CFD FLOW CONTROL, Continued from previous page

(Priority Type)



Model CFD

Order Code	Bill of Material #	Port Size	Regulated Flow	Relief
CFD-75-7-HP	07261039	3/4" NPT	7 GPM	1500-2500 PSI
CFD-75-8	07261041	3/4" NPT	8 GPM	500-1500 PSI
CFD-75-8-HP	07261042	3/4" NPT	8 GPM	1500-2500 PSI
CFD-75-8-HP-2000	08650684	3/4" NPT	8 GPM	2000 PSI
CFD-75-8-NR	07261040	3/4" NPT	8 GPM	None
CFD-75-9-HP	07261044	3/4" NPT	9 GPM	1500-2500 PSI
CFD-75-10	07261045	3/4" NPT	10 GPM	500-1500 PSI
CFD-75-10-HP	07261046	3/4" NPT	10 GPM	1500-2500 PSI
CFD-75-10-NR	00983349	3/4" NPT	10 GPM	None
CFD-10-1	07261104	SAE 10	1 GPM	500-1500 PSI
CFD-10-1.5	07261088	SAE 10	1.5 GPM	500-1500 PSI
CFD-10-1.5 HP	07261091	SAE 10	1.5 GPM	1500-2500 PSI
CFD-10-1.5-HP-2000	08650689	SAE 10	1.5 GPM	2000 PSI
CFD-10-1.5-NR	07261107	SAE 10	1.5 GPM	None
CFD-10-2	07261095	SAE 10	2 GPM	500-1500 PSI
CFD-10-2-NR	07261103	SAE 10	2 GPM	None
CFD-10-3	07261099	SAE 10	3 GPM	500-1500 PSI
CFD-10-3-NR	07261100	SAE 10	3 GPM	None
CFD-10-4	07261092	SAE 10	4 GPM	500-1500 PSI
CFD-10-4-HP	07261101	SAE 10	4 GPM	1500-2500 PSI
CFD-10-4-HP-2000	08650688	SAE 10	4 GPM	2000 PSI
CFD-10-5-HP	07261070	SAE 10	4 GPM	1500-2500 PSI
CFD-10-5-NR	07261096	SAE 10	5 GPM	None
CFD-10-6-HP	07261108	SAE 10	6 GPM	1500-2500 PSI
CFD-10-9-HP	07261110	SAE 10	9 GPM	1500-2500 PSI
CFD-10-10-HP	07261102	SAE 10	10 GPM	1500-2500 PSI

MODEL CFDA FLOW CONTROL

(Priority Type)



Model CFDA

Order Code	Bill of Material #	Locknut Option	Port	Flow
CFDA-50	07261052		1/2" NPT	Adjustable
CFDA-L-50	07261053	•	1/2" NPT	Adjustable
CFDA-75	07261054		3/4" NPT	Adjustable
CFDA-L-75	07261055	•	3/4" NPT	Adjustable
CFDA-10	07261089		SAE 10	Adjustable
CFDA-L-10	07261109	•	SAE 10	Adjustable

Note: CFDA not available with relief.

Option Kits (Models CFD & CFDA)

Order Code	Bill of Material #	Description	Order Code	Bill of Material #	Description
K-CFDA-L	08650262	Locknut Option, for Adjustable Flow Divider only	K-CFD-6	08650255	Constant Flow Spool Kit (6 GPM)
K-CFD-R-HP	08650261	Relief Option for Model CFD, 1500-2500 PSI	K-CFD-7	08650254	Constant Flow Spool Kit (7 GPM)
K-CFD-1.5	08650260	Constant Flow Spool Kit (1.5 GPM)	K-CFD-8	08650253	Constant Flow Spool Kit (8 GPM)
K-CFD-2	08650259	Constant Flow Spool Kit (2 GPM)	K-CFD-9	08650252	Constant Flow Spool Kit (9 GPM)
K-CFD-3	08650258	Constant Flow Spool Kit (3 GPM)	K-CFD-10	08650251	Constant Flow Spool Kit (10 GPM)
K-CFD-4	08650256	Constant Flow Spool Kit (4 GPM)			
K-CFD-5	08650257	Constant Flow Spool Kit (5 GPM)			

Flow Dividers

MODEL DC25A FLOW CONTROL (Adjustable)

(Priority Type)

Order Code	Bill of Material #	Port Size	Flow	Relief Option (R)*
DC25A-50-0-NR	08387010	1/2" NPT	Adjustable	
DC25A-50-0-R	08387011	1/2" NPT	Adjustable	1500 PSI
DC25A-75-0-NR	08387009	3/4" NPT	Adjustable	
DC25A-75-0-R	08387012	3/4" NPT	Adjustable	1500 PSI
DC25A-10-0-NR	08387057	SAE 10	Adjustable	
DC25A-10-0-R-2000PSI	00982998	SAE 10	Adjustable	2000 PSI
DC25A-12-0-NR	08387003	SAE 12	Adjustable	
DC25A-12-0-R	08387004	SAE 12	Adjustable	1500 PSI



Model DC25

MODEL DC25N FLOW CONTROL (Non-adjustable)

(Priority Type)

Order Code	Bill of Material #	Port Size	Constant Flow	Relief Option (R)*
DC25N-50-2-NR	08387045	1/2" NPT	2 GPM	None
DC25N-50-4-NR	08387046	1/2" NPT	4 GPM	None
DC25N-50-5-NR	08387020	1/2" NPT	5 GPM	None
DC25N-50-7-NR	08387047	1/2" NPT	7 GPM	None
DC25N-75-1.5-NR	08387071	3/4" NPT	1.5 GPM	None
DC25N-75-3-NR	08387019	3/4" NPT	3 GPM	None
DC25N-75-6-NR	08387063	3/4" NPT	6 GPM	None
DC25N-75-6-R	08387032	3/4" NPT	6 GPM	1500 PSI
DC25N-10-6-R	08387065	SAE 10	6 GPM	1500 PSI
DC25N-12-3-NR	08387066	SAE 12	3 GPM	None
DC25N-12-4-NR	00983157	SAE 12	4 GPM	None
DC25N-12-6-NR	08387055	SAE 12	6 GPM	None
DC25N-12-6-R	00983122	SAE 12	6 GPM	1500 PSI
DC25N-12-12-NR	08387069	SAE 12	12 GPM	None

*Relief valve set at 1500 PSI.

Option Kits — Orifice Plug (For DC25N Only)

Includes one 9321-056 Retaining Ring, one 7828-001 O-Ring Seal and one Orifice Plate.

Order Code	Bill of Material #	Description
K-OP-1	08650363	1 GPM
K-OP-1.5	08650362	1.5 GPM
K-OP-2	08650361	2 GPM
K-OP-3	08650360	3 GPM
K-OP-4	08650359	4 GPM
K-OP-5	08650358	5 GPM
K-OP-6	08650357	6 GPM
K-OP-7	08650356	7 GPM
K-OP-8	08650355	8 GPM
K-OP-9	08650354	9 GPM
K-OP-10	08650353	10 GPM
K-OP-12	08650352	12 GPM
K-OP-14	08650351	14 GPM
K-OP-16	08650350	16 GPM

Flow Controls

MANUAL SPREADER VALVES

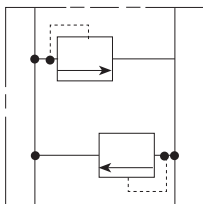
Description	Bill of Material #	Double w/ Man. Shut.	Double w/o Man. Shut.	Single w/ Man. Shut.	Single w/o Man. Shut.	Double w/LS & Man. Shut.	SOL OP (12V) Shut.	12 SAE	3/4" NPT	First Adjustment			Second Adjustment			Relief Option		
										0-5	0-7	0-10	0-10	0-16	0-30	ADJ.	NON ADJ.	NO REL.
QAA-12-A16-NA	97929-05				•			•						•			•	
QAB-12-A00-B16-AR-01	97920-02			•				•						•		•		
QAB-75-A00-B10-NA	97921-04			•					•				•				•	
QAB-75-A00-B16-AR-01	97921-02			•					•					•		•		
QAB-75-A00-B16-NA	97921-05			•					•					•			•	
QAB-75-A00-B30-AR-01	97921-03			•					•						•	•		
QAB-75-A00-B30-NA	97921-06			•					•						•		•	
QDA-12-A07-B16-NR	97922-23		•					•			•			•				•
QDA-12-A10-B16-NR	97922-26		•					•				•		•				•
QDA-75-A10-B30-NA	97923-18		•						•			•			•		•	
QDB-12-A05-B10-NR	97919-25	•						•		•			•					•
QDB-12-A05-B16-AR-01	97919-02	•						•		•				•		•		
QDB-12-A07-B16-AR-01	97919-05	•						•			•			•		•		
QDB-12-A07-B16-NA	97919-14	•						•			•			•			•	
QDB-12-A10-B10-AR	97919-07	•						•				•	•			•		
QDB-12-A10-B16-AR-01	97919-08	•						•				•		•		•		
QDB-12-A10-B20-AR	97919-21	•						•				•			•	•		
QDB-12-A10-B30-AR-01	97919-09	•						•				•			•	•		
QDB-12-A10-B30-NA	97919-18	•						•				•			•		•	
QDB-75-A05-B10-AR-01	97917-01	•							•	•			•			•		
QDB-75-A05-B10-NA	97917-10	•							•	•			•				•	
QDB-75-A05-B16-AR-01	97917-02	•							•	•				•		•		
QDB-75-A05-B16-NA	97917-11	•							•	•				•			•	
QDB-75-A05-B30-AR-01	97917-03	•							•	•					•	•		
QDB-75-A07-B16-AR-01	97917-05	•							•		•			•		•		
QDB-75-A07-B16-NA	97917-14	•							•		•			•			•	
QDB-75-A07-B16-NR	97917-23	•							•		•			•				•
QDB-75-A10-B16-AR-01	97917-08	•							•			•		•		•		
QDB-75-A10-B30-AR-01	97917-09	•							•			•			•	•		
QDB-75-A10-B30-NA	97917-18	•							•			•			•		•	
QDB-75-A10-B30-NR	97917-27	•							•			•			•			•
QDL-12-A05-B10-NR	97918-01					•		•		•			•					•
QDL-12-A05-B16-NR	97918-02					•		•		•				•				•
QDL-12-A07-B16-NR	97918-05					•		•			•			•				•
QDL-12-A10-B16-NR	97918-08					•		•				•		•				•
QDL-12-A10-B30-NR	97918-09					•		•				•			•			•
QDL-75-A07-B16-NR	97916-05					•			•		•			•				•
QDL-75-A10-B30-NR	97916-09					•			•			•			•			•
QDA-12-A05-B10-NR	97922-19		•					•		•			•					•
QDS-12-A07-B16-AR-12	97932-01						•	•			•			•		•		
QDS-12-A10-B16-AR-12	97932-02						•	•				•		•		•		
QDS-12-A10-B30-AR-12	97932-03						•	•				•			•	•		
QDS-75-A07-B16-AR-12	97931-01						•		•		•			•		•		
QDS-75-A05-B16-NA-12	97931-03						•		•	•				•			•	
QDS-75-A07-B16-NA-12	97931-04						•		•		•			•			•	
QDS-75-A10-B30-AR-12	97931-02						•		•			•			•	•		
QDS-75-A10-B30-NA-12	97931-05						•		•			•			•		•	

DOUBLE RELIEF CUSHION VALVES

FOR USE WITH CYLINDERS OR MOTORS OF EQUAL DISPLACEMENT

MODEL DXV

Ball/Spring Relief Valve



MODEL DWV

Uses Model WH
Relief Cartridge
Differential Poppet Type



DXV and DWV Cushion Valves are designed to eliminate or minimize shock, surge and overload conditions on hydraulic equipment. They may be used with cylinders of equal displacement, or with motors, to provide crossover relief upon stoppage.

Under standard conditions, when a control valve is in neutral or closed position, the excess pressure created by overload, shock or stress has no possibility of relief through the primary relief valve. A Cushion Valve located between the control valve and the actuator minimizes or eliminates this condition.

In a motor application, the need for an anti-cavitation check may be eliminated, since relieved oil is directed into the opposite side of the Cushion Valve.

Model DXV, with ball/spring relief valves, has hardened seats for long, trouble-free service. It is available with a 5 PSI [0,3 bar] check spring which will allow the cushion valve to act as a relief in one direction and permits free-flow at 5 PSI [0,3 bar] in the opposite direction.

Model DWV has cartridge-type, hydraulically-dampened reliefs (Model WH). It features quieter operation and gives a smaller differential between cracking and full-flow pressures. An optional adjustment is available.

Features

- Non-adjustable Type Reliefs – can be adjusted by adding or subtracting shims.
- Adjustable Relief Available for Model DWV.
- Factory Pre-Set to Customer's Specific Pressure Requirements
- High-Tensile, Cast Iron Body.

Specifications

	DXV	DWV
Capacity (nominal):	10 GPM (37 litres/min)	30 GPM (113 litres/min)
Minimum Operating Pressure:	.5 PSI (0,3 bar)	300 PSI (20 bar)
Maximum Operating Pressure:	2500 PSI (172 bar)	3000 PSI (207 bar)
Shipping Weight:	.4 lbs (1,8 kg)	5 lbs (2,3 kg)

Cushion Valves

MODEL DXV CUSHION VALVES

Ball/Spring Type Dual Crossover Relief

Model	Bill of Material #	Port Size	Pressure Range, PSI*								
			50-400	401-750	751-900	901-1300	1301-1450	1451-1800	1801-2000	2001-3000	3001-3500
DXV-38 50-400 PSI	07595029	3/8" NPT	•								
DXV-38 401-750 PSI	07595005	3/8" NPT		•							
DXV-38 751-900 PSI	07595094	3/8" NPT			•						
DXV-38 901-1300 PSI	07595015	3/8" NPT				•					
DXV-38 1301-1450 PSI	07595020	3/8" NPT					•				
DXV-38 1451-1800 PSI	07595006	3/8" NPT						•			
DXV-38 1801-2000 PSI	07595021	3/8" NPT							•		
DXV-38 2001-3000 PSI	07595022	3/8" NPT								•	
DXV-50 50-400 PSI	07595017	1/2" NPT	•								
DXV-50 401-750 PSI	07595011	1/2" NPT		•							
DXV-50 751-900 PSI	07595010	1/2" NPT			•						
DXV-50 901-1300 PSI	07595003	1/2" NPT				•					
DXV-50 1301-1450 PSI	07595028	1/2" NPT					•				
DXV-50 1451-1800 PSI	07595002	1/2" NPT						•			
DXV-50 1801-2000 PSI	07595009	1/2" NPT							•		
DXV-50 2001-3000 PSI	07595004	1/2" NPT								•	
DXV-50 3001-3500 PSI	07595025	1/2" NPT									•
DXV-75 901-1300 PSI	07595008	3/4" NPT				•					
DXV-75 1451-1800 PSI	07595019	3/4" NPT						•			
DXV-75 1801-2000 PSI	07595048	3/4" NPT							•		
DXV-75 2001-3000 PSI	07595036	3/4" NPT								•	
DXV-75-1300	08650408	3/4" NPT				•					
DXV-75-1800	08650409	3/4" NPT						•			
DXV-75-2000	08650410	3/4" NPT							•		
DXV-8 401-750 PSI	07595023	SAE 8		•							
DXV-8 901-1300 PSI	07595026	SAE 8				•					
DXV-8 1451-1800 PSI	07595054	SAE 8						•			
DXV-8 1801-2000 PSI	07595024	SAE 8							•		
DXV-8 2001-3000 PSI	07595016	SAE 8								•	
DXV-10 401-750 PSI	07595082	SAE 10		•							
DXV-10 751-900 PSI	07595070	SAE 10			•						
DXV-10 901-1300	07595074	SAE 10				•					
DXV-10 1451-1800 PSI	07595047	SAE 10						•			
DXV-10 1801-2000 PSI	07595030	SAE 10							•		
DXV-10 2001-3000 PSI	07595103	SAE 10								•	
DXV-10-2500	08650404	SAE 10								•	

*Relief valves set at the high setting within the range selected. (Exception: Order Code DXV-10-2500 is set at 2500 PSI.)



Model DXV

Cushion Valves



Model DWV

MODEL DWV CUSHION VALVES

(Differential Type Double Relief)

Model and Pressure Range* or Pressure Setting	Bill of Material #	Port Size	Adjustment Option	Stainless Steel Spring
DWV-50 500-1249 PSI	03744008	1/2" NPT	Shim	
DWV-50 1250-1749 PSI	03744009	1/2" NPT	Shim	
DWV-50 1750-1999 PSI	03744010	1/2" NPT	Shim	
DWV-50 2000-2599 PSI	03744011	1/2" NPT	Shim	
DWV-50-1350	08650411	1/2" NPT	Shim	
DWV-50-1750	08650412	1/2" NPT	Shim	
DWV-50-2000	08650413	1/2" NPT	Shim	
DWV-50-A 500-1249 PSI	03744021	1/2" NPT	Screw	
DWV-50-A 1250-1749 PSI	03744028	1/2" NPT	Screw	
DWV-50-A 1750-1999 PSI	03744037	1/2" NPT	Screw	
DWV-50-A 2001-2600 PSI	03744045	1/2" NPT	Screw	
DWV-50-SS 1750-1999 PSI	03744051	1/2" NPT	Shim	
DWV-75 500-1249 PSI	03744003	3/4" NPT	Shim	
DWV-75 1250-1749 PSI	03744004	3/4" NPT	Shim	
DWV-75 1750-1999 PSI	03744005	3/4" NPT	Shim	
DWV-75 2000-2599 PSI	03744006	3/4" NPT	Shim	
DWV-75 2601-3000 PSI	03744061	3/4" NPT	Shim	
DWV-75-1350	08650414	3/4" NPT	Shim	
DWV-75-1750	08650415	3/4" NPT	Shim	
DWV-75-2000	08650416	3/4" NPT	Shim	
DWV-75-A 1250-1750 PSI	03744015	3/4" NPT	Screw	
DWV-75-A 1751-2000 PSI	03744034	3/4" NPT	Screw	
DWV-75-A 2001-2600 PSI	03744039	3/4" NPT	Screw	
DWV-75-A 2001-2600 PSI	03744016	3/4" NPT	Screw	
DWV-8 500-1249 PSI	03744029	SAE 8	Shim	
DWV-8 1750-1999 PSI	03744001	SAE 8	Shim	
DWV-8 2000-2599 PSI	03744002	SAE 8	Shim	
DWV-8-SS 1250-1749 PSI	03744060	SAE 8	Screw	*
DWV-8-A 2001-2600 PSI	03744057	SAE 8	Screw	
DWV-10 1750-1999 PSI	03744022	SAE 10	Shim	
DWV-10 2000-2599 PSI	03744040	SAE 10	Shim	
DWV-10-A 1351-1750 PSI	03744035	SAE 10	Screw	
DWV-10-A 2001-2600 PSI	03744053	SAE 10	Screw	
DWV-12 1750-1999 PSI	03744012	SAE 12	Shim	
DWV-12 2000-2599 PSI	03744047	SAE 12	Shim	
DWV-12 2500-3000 PSI	03744059	SAE 12	Shim	
DWV-12 500/2000 PSI	00983060	SAE 12	Shim	
DWV-12-A 2000 PSI	03744063	SAE 12	Screw	
DWV-12-A 2001-2600 PSI	03744032	SAE 12	Screw	

*Relief Valves set @ the high setting within the pressure range unless specified.

Option Kits (Model DWV)

Order Code	Bill of Material #	Description	Maximum Allowable Working Pressure, PSI*
K-DWV-10	08650238	DWV Housing — SAE 10 for WH Relief Valve	3000
K-DWV-50	08650239	DWV Housing — 1/2" NPT for WH Relief Valve	2000
K-DWV-75	08650240	DWV Housing — 3/4" NPT for WH Relief Valve	2000

NOTE: Do not use Model RP51 relief cartridge in DWV housings.

UP TO 20 GPM CAPACITY RELIEF VALVES

Models JT and JL Relief Valves are used to limit the maximum pressure which can be applied to the portion of the hydraulic circuit to which they are connected. They may be used as a system relief when installed between the pump and the first of a series of separate control valves or as a line relief by installing between a control valve port and actuator.

Adjustable valves can be readily reset and feature a jam nut to lock the new setting.

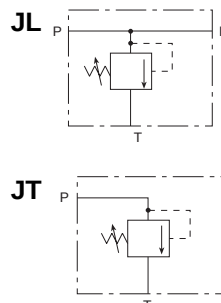
Shim-set valves are best left unchanged after installation due to manufacturing tolerances.

Features

- Two Housings Available For Tee-Mounting or In-Line Mounting.
- Adjustable and Non-Adjustable Models Available.
- Compacted Graphite Bodies.
- Replaceable, Hardened Seat.

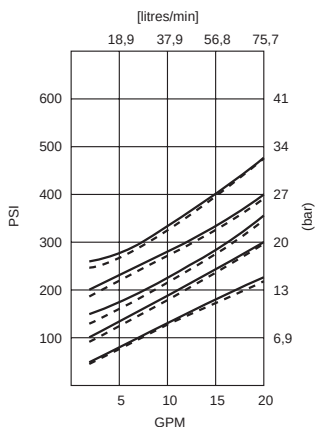
PERFORMANCE DATA

MODEL JT MODEL JL

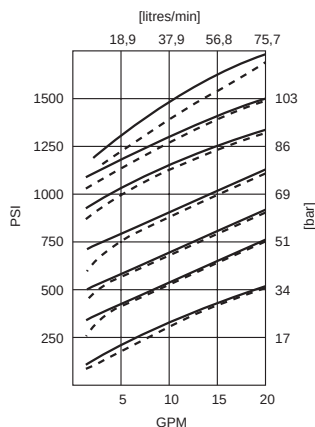


Specifications

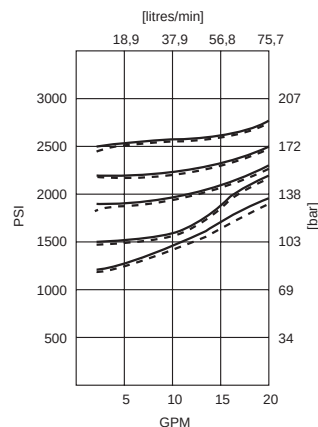
Capacity (nominal) Adjustable: Up to 20 GPM (75 litres/min)
Maximum Operating Pressure: 2500 PSI (172 bar)
Shipping Weight: Approx. 2½ lbs. (1,1 kg)



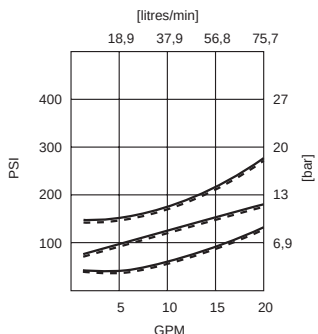
JT (LP) Relief With 953-001 Spring
145-400 PSI [10-27,6 bar]. Crack.



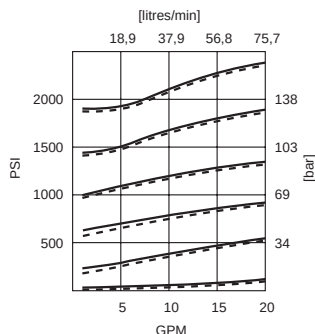
JT Relief
290-1200 PSI [20-83 bar]. Crack



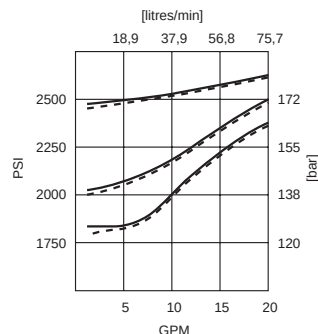
JT (HP) Relief
1201-2500 PSI [83-172 bar]. Crack.



JT-N (LP) Relief With 987-011 Spring
50-200 PSI [3,4-13,8 bar]. Crack



JT-N Relief
300-1800 PSI [20,7-124 bar]. Crack



JT-N (HP) Relief
1801-2500 PSI [124-172 bar]. Crack

UP TO 25 GPM CAPACITY RELIEF VALVES

MODELS WJT/RPJT WJL/RPJL

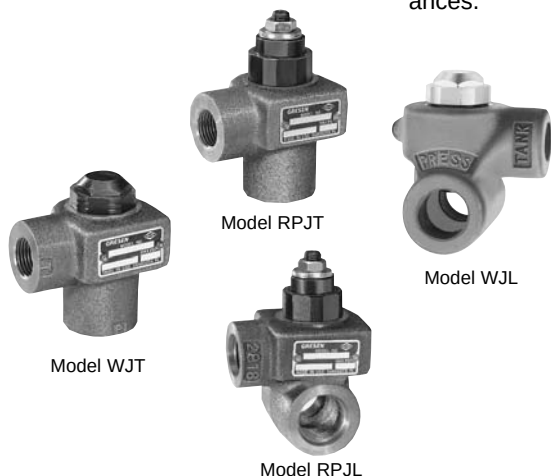
WJT/RPJT and WJL/RPJL Relief Valves are used for limiting the maximum pressure which can be applied to the portion of the hydraulic circuit to which it is connected.

These valves have housings constructed of high strength compacted graphite cast iron. Differential Poppet Reliefs, Model WJ, allow pressure settings up to 3000 PSI [207 bar]. Pilot-Operated Reliefs, Model RP, allow pressure settings up to 5000 PSI [345 bar].

Adjustable valves can be readily reset and feature a jamnut to lock the new setting. Shim-set valves are best left unchanged after installation, due to manufacturing tolerances.

Features

- Compact, Low Profile Design.
- Compacted Graphite Bodies.
- All Units Are Factory "Pre-set"

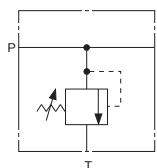
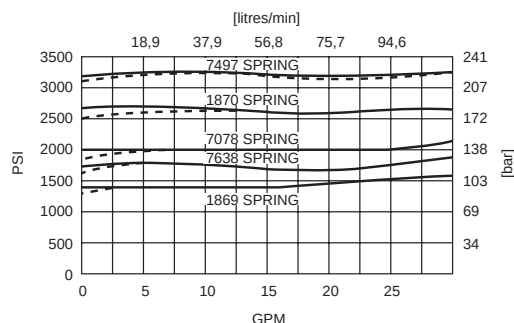
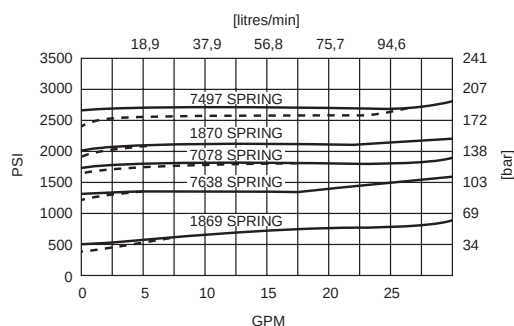


Specifications

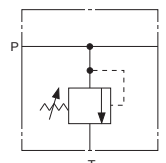
Capacity (nominal): Up to 25 GPM (94 litres/min)

Maximum Operating Pressure:(WJ) 3000 PSI (207 bar)
.....(RPJ) 5000 PSI (345 bar)

Shipping Weight: 3 lbs. (1,4 kg)



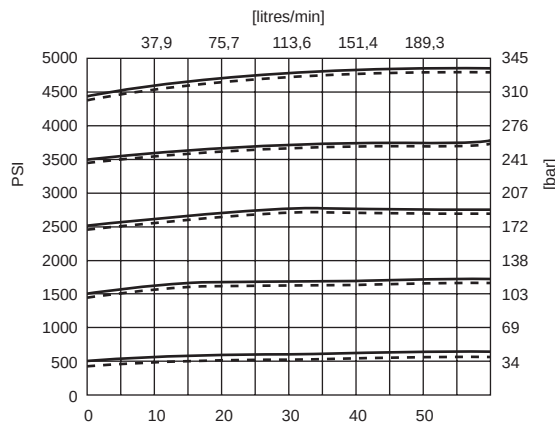
WJL/RPJL
Adjustable



WJT/RPJL
SHIM-SET

PERFORMANCE DATA

—— Increasing Flow
----- Decreasing Flow
150 SUS Oil



UP TO 60 GPM CAPACITY RELIEF VALVES

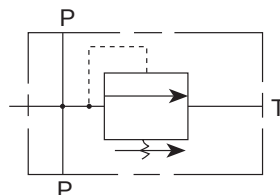
These Relief Valves have been designed to give long life and smooth performance. They afford over-load protection for hydraulic circuits and for structural members of tools and machines.

RPL Pilot Relief Valves and KCL Ball/Spring Relief Valves are available as adjustable or non-adjustable. An optional gage port is available on Model RPL.

MODEL KL MODEL RPL

Features

- In-Line Mounting.
- Adjustable.
- Compacted Graphite Bodies.
- Smooth and Quiet Operation.
- Optional Gauge Port.



MODEL KCL-N



MODEL RPL-A

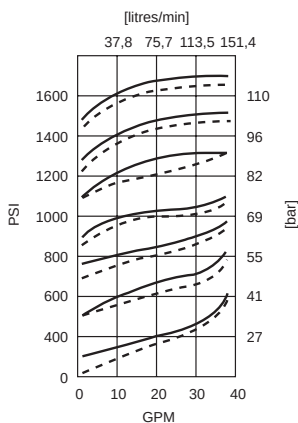


Specifications

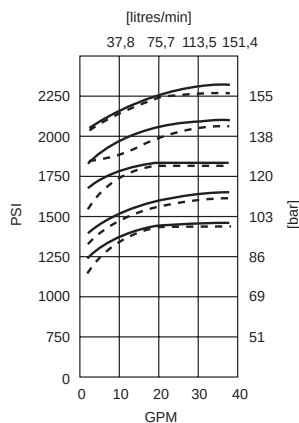
	RPL	KL
Capacity (nominal):	Up to 60 GPM (227 litres/min)	Up to 38 GPM (143 litres/min)
Maximum Operating Pressure:	500-5000 PSI (34-345 bar)	300-2000 PSI (20-138 bar)
Shipping Weight:	6 lbs (2,7 kg)	6 3/4 lbs (3,1 kg)

PERFORMANCE DATA

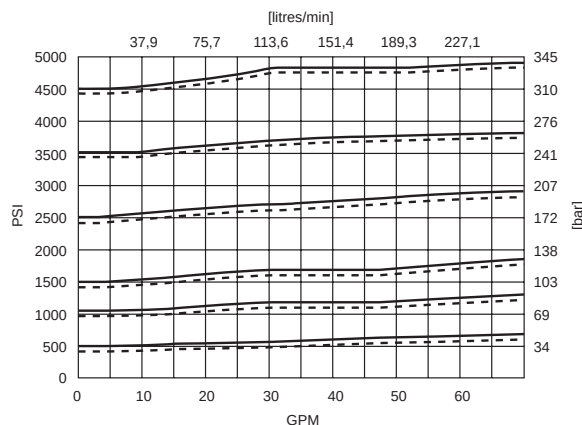
— Increasing Flow
- - - - - Decreasing Flow
150 SUS Oil



Model KCL
300-1500 PSI [20-103 bar], Crack.



Model KCL (HP)
1501-2000 PSI [103-138 bar], Crack.



Model RPL
500-5000 PSI [34-345 bar], Crack.

Relief Valves

MODEL JT RELIEF VALVES

(Ball/Spring, Tee Mounted Type)



Model JT

Order Code	Bill of Material #	Port Size	Adjustment Option	Pressure Range, PSI*				
				100-250	290-1200	1301-1800	1201-2500	1801-2500
JT-50	11904009	1/2" NPT	Screw		•			
JT-50-A	11905008	1/2" NPT	Handle		•			
JT-50-A-HP	11905009	1/2" NPT	Handle				•	
JT-50-A-LP	11905010	1/2" NPT	Handle	•				
JT-50-HP	11904010	1/2" NPT	Screw				•	
JT-50-LP	11904008	1/2" NPT	Screw	•				
JT-50-N 1301-1800 PSI	11906008	1/2" NPT	Shim			•		
JTR-50-N-HP-1801-2500 PSI	11906009	1/2" NPT	Shim					•
JT-8	11904015	8 SAE	Screw		•			
JT-8-LP 50-250 PSI	11904014	8 SAE	Screw	•				
JT-10 290-1200 PSI	11904001	10 SAE	Handle				•	
JT-10-A-HP 1201-2500 PSI	11905006	10 SAE	Screw				•	

*Relief valves set at the high setting within the range selected.

MODEL JL RELIEF VALVES

(Ball/Spring, Tee Mounted Type)



Model JL

Order Code	Bill of Material #	Port Size	Adjustment Option	Pressure Range, PSI*				
				50-300	145-400	290-1200	301-1800	1201-2500
JL-10-HP 1201-2500 PSI	11893007	SAE 10	Screw					•
JL-50 290-1200 PSI	11893002	1/2" NPT	Screw			•		
JL-50-A 290-1200 PSI	12057002	1/2" NPT	Handle			•		
JL-50-A-HP 1201-2500 PSI	12057001	1/2" NPT	Handle					•
JL-50-HP 1201-2500 PSI	11893003	1/2" NPT	Screw					•
JL-50-HP-2000	08650474	1/2" NPT	Screw					•
JL-50-LP 145-400 PSI	11893001	1/2" NPT	Screw		•			
JL-50-N 301-1800 PSI	12058001	1/2" NPT	Shim				•	
JL-50-N-LP 50-400 PSI	12058002	1/2" NPT	Shim	•				
JL-50-1200	08650472	1/2" NPT	Screw			•		
JL-75 290-1200 PSI	11893005	3/4" NPT	Screw			•		
JL-75-A 290-1200 PSI	12057003	3/4" NPT	Handle			•		
JL-75-A-HP 1201-2500 PSI	12057004	3/4" NPT	Handle					•
JL-75-HP 1201-2500 PSI	11893006	3/4" NPT	Screw					•
JL-75-LP 145-400 PSI	11893004	3/4" NPT	Screw		•			
JL-75-N-LP 145-400 PSI	12058003	3/4" NPT	Shim	•				
JL-75-1200	08650477	3/4" NPT	Screw			•		
JL-75-2000-HP	08650478	3/4" NPT	Screw					•

*Relief valves set at the high setting within the range selected. (Exception: order code JT-50-2000-HP is set at 2000 PSI)

Relief Valves

Handle

Order Code	Bill of Material #	Description
K-JA	08650246	Adjustable Handle for JT and JL Relief

MODEL WJT RELIEF VALVES

(Differential, Tee Mounted type)

Model	Bill of Material #	Port Size	Adjustment Option	Pressure Range, PSI*					
				300-499	500-1249	1250-1749	1750-1999	2000-2599	2600-3000
WJT-38	11908029	3/8" NPT	Shim		•				
WJT-50	11908011	1/2" NPT	Shim		•				
WJT-50-N	11903010	1/2" NPT	Shim			•			
WJT-50	11908012	1/2" NPT	Shim**			•			
WJT-50	11908013	1/2" NPT	Shim				•		
WJT-50	11908014	1/2" NPT	Shim					•	
WJT-50	11908015	1/2" NPT	Shim						•
WJT-50	11908010	1/2" NPT	Screw	•					
WJT-50-A	11902012	1/2" NPT	Screw				•		
WJT-8	11908025	SAE 8	Shim		•				
WJT-8-A	11902015	SAE 8	Screw		•				
WJT-10	11908001	SAE 10	Shim		•				
WJT-10	11908004	SAE 10	Shim			•			
WJT-10	11560341	SAE 10	Shim				•		
WJT-10	11908005	SAE 10	Shim					•	
WJT-10A	11902004	SAE 10	Screw					•	
WJT-10-A	11902005	SAE 10	Screw						•

*Relief valves set at the high setting within the range selected.

**Includes lockwire.



Model WJT

Relief Valves

MODEL WJL RELIEF VALVES

(Differential, Inline Mounted type)



Model WJL

Model	Bill of Material #	Port Size	Adjustment Option	Pressure Range, PSI*					
				300-499	500-1249	1250-1749	1750-1999	2000-2599	2600-3000
WJL-50	11414001	1/2" NPT	Shim		•				
WJL-50	11414002	1/2" NPT	Shim			•			
WJL-50	11414003	1/2" NPT	Shim				•		
WJL-50	11414004	1/2" NPT	Shim					•	
WJL-50	11414005	1/2" NPT	Shim						•
WJL-50-A	12055002	1/2" NPT	Screw			•			
WJL-50-A	12055007	1/2" NPT	Screw		•				
WJL-50-A	00983117	1/2" NPT	Screw					•	
WJL-50-N	12056006	1/2" NPT	Shim**						
WJL-75	11414007	3/4" NPT	Shim		•				
WJL-75	11414008	3/4" NPT	Shim			•			
WJL-75	11414009	3/4" NPT	Shim				•		
WJL-75	11414010	3/4" NPT	Shim					•	
WJL-75	11414011	3/4" NPT	Shim						•
WJL-75-A	12055005	3/4" NPT	Screw				•		
WJL-75-A	12055004	3/4" NPT	Screw						•
WJL-75-N	12056004	3/4" NPT	Shim**						•
WJL-75-N	12056005	3/4" NPT	Shim**						
WJL-75-N	12056007	3/4" NPT	Shim**						
WJL-75-N	12056003	3/4" NPT	Shim**						•
WJL-10	11414013	SAE 10	Shim	•					
WJL-10	11414014	SAE 10	Shim		•				
WJL-10	11414015	SAE 10	Shim			•			
WJL-10	11414016	SAE 10	Shim				•		
WJL-10	11414017	SAE 10	Shim					•	
WJL-10-A	12055003	SAE 10	Screw						
WJL-10-A	12055006	SAE 10	Screw						
WJL-10-A	00983029	SAE 10	Screw						
WJL-10-N	12056001	SAE 10	Shim**						
WJL-10-N	12056002	SAE 10	Shim**						
WJL-12	11414023	SAE 12	Shim					•	
WJL-12	11414022	SAE 12	Shim						•

*Relief valves set at the high setting within the range selected

**Includes lockwire

Relief Valves

MODEL RPJT RELIEF VALVES

Pilot Operated

Order Code	Bill of Material #	Type	Port Size	Adjustment Option	Pressure Range*
RPJT-10-A	11907001	Pilot	SAE 10	Adjustable	500-3500 PSI
RPJT-8-A	11907003	Pilot	SAE 8	Adjustable	500-3500 PSI

*Relief valves set @ 3500 PSI.

Consult factory for applications over 3500 PSI.

Relief Cartridge Options (Models RPJT/WJT and RPJL/WJL)

Order Code	Bill of Material #	Type	Pressure Range, PSI	Pressure Setting, PSI
WH-1200	08650417	Differential Poppet	500-1249	1200
WH-1700	08650418	Differential Poppet	1250-1749	1700
WH-1950	08650419	Differential Poppet	1750-1999	1950
WH-2550	08650420	Differential Poppet	2000-3000	2550
WH-3000	08650398	Differential Poppet	2000-3000	3000
RP51A-3000	08650421	Pilot	500-5000	3000

NOTE: All above Relief Valves have stainless steel springs. WH Relief Valves are shim set, RP51A Relief Valves are screw adjustable. All Relief Valves set at "crack" pressure of 1 GPM flow.

Housing Option Kits (Models WJT and WJL)

Order Code	Bill of Material #	Description	Maximum Allowable Working Pressure, PSI*
K-WJT-50	08650245	WJT Housing with 1/2" NPT Ports	3500
K-WJL-50	08650244	WJL Housing with 1/2" NPT Ports	3500
K-WJL-75	08650243	WJL Housing with 3/4" NPT Ports	3500
K-WJT-10	08650242	WJL Housing with SAE 10 Ports	3500
K-WJL-10	08650241	WJL Housing with SAE 10 Ports	3500

*Consult factory for applications over 3500 PSI.

Order Code	Bill of Material #	Description
K-WH-A	08650381	Screw Adjustable Option for WH Cartridge Reliefs.

Relief Valves

MODEL RPL RELIEF VALVES

(Inline Mounted)



Model RPL

Order Code	Bill of Material #	Type	Port Size	Adjustment Option	Pressure Range*	3/4" NPT Gage Port [G]
RPL-75-A	11370005	Pilot	3/4" NPT	Adjustable	500-3500 PSI	
RPL-75-N	11370006	Pilot	3/4" NPT	Tamperproof	500-3500 PSI	
RPL-100-A	11370007	Pilot	1" NPT	Adjustable	500-3500 PSI	
RPL-100-A-G	11370020	Pilot	1" NPT	Adjustable	500-3500 PSI	•
RPL-100-N	11370008	Pilot	1" NPT	Tamperproof	500-3500 PSI	
RPL-16-A	11370003	Pilot	SAE 16	Adjustable	500-3500 PSI	
RPL-16-A-G	11370001	Pilot	SAE 16	Adjustable	500-3500 PSI	•
RPL-16-N	11370004	Pilot	SAE 16	Tamperproof	500-3500 PSI	
RPL-16-N-G	11370002	Pilot	SAE 16	Tamperproof	500-3500 PSI	•

*Relief valve set at 3500 PSI.

Consult factory for applications over 3500 PSI.

Relief Cartridge Options

(Models KL and RPL)

Order Code	Bill of Material #	Type	Pressure Range, PSI		
			400-1400 Set @ 1100	1401-2000 Set @ 2000	500-5000 Set @ 2500
KC-LP-1100	08650391	Ball/Spring	•		
KC-HP-2000	08650392	Ball/Spring		•	
RP60A-2500	08650393	Pilot			•

NOTE: KC and RP60A Relief Valves are screw adjustable. Set at "crack" pressure of 1 GPM flow.

Housing Option Kits

(Models RPL)

Order Code	Bill of Material #	Description	Maximum Allowable Working Pressure, PSI*
K-RPL-16	08650345	Relief Valve Housing w/SAE 16 Ports	3500
K-RPL-75	08650344	Relief Valve Housing w/3/4" NPT Ports	3500
K-RPL-100	08650346	Relief Valve Housing w/1" NPT Ports	3500

Consult factory for applications over 3500 PSI.